# The IRON AGE

Vol. 161, No. 18 April 29, 1948



## Editorial

Phony Profits....69

## Technical Articles

The Openhearth Furnace--Silica Roofs....72
Detergent Additions Improve Pickling Bath...77
High Temperature Materials by Powder Metals..78
Steelmakers Review Production Problems....82
Radioactive Tracers in Steelmaking....85
New Books....85
Rapid Processing of Automobile Door Hinges...86
Green Core Handling Simplified....90
Tangent Bender Forms Camera Body Parts....92
New Equipment....95

## Features

Fatigue Cracks....52
Dear Editor....54
Newsfront....71
Assembly Line....100
Washington....104
West Coast....108
Personals....112
European Letter....114
Industrial News Summary....116
News of Industry....119

## News and Markets

Texas Steel Consumers' Needs....119-120
No Increase in Canadian Aluminum....121
Industrial Briefs....122
Good Management-Labor Relations....123
Machine Tool Developments....126
Iron and Steel Scrap News and Prices...129-130
Nonferrous Market News and Prices....131-132
Comparison of Prices by Week and Year....133
Finished and Semifinished Steel Prices....134
Alloy Steel Prices....135
Pipe and Tubing Prices....136
Warehouse Steel and Pig Iron Prices....137
Ferroalloy Prices....138

Index to Advertisers....173-174



**THOMAS L. KANE**
*Publisher*

B. H. HAYES
Production Manager

C. E. ELLIS
Promotion Manager

O. L. JOHNSON
Manager Market Research

CHARLES T. POST
Manager Circulation and Reader Service

Executive Offices
Chestnut and 56th Sts.
Philadelphia 39, Pa., U.S.A.
Editorial and Advertising Offices
100 E. 42nd St., New York 17, N.Y., U.S.A.

Regional Business Managers

FRED BANNISTER
W. Hartford 7, Conn.
62 La Salle Road

ROBERT F. BLAIR
Cleveland 14
1016 Guardian Bldg.

C. H. OBER
H. F. LEONARD
New York 17
100 E. 42nd St.

PEIRCE LEWIS
Detroit 2
103 Pallister Ave.

B. L. HERMAN
Philadelphia 39
Chilton Bldg.

STANLEY J. SMITH
Chicago 3
1134 Otis Bldg.

JOHN M. HUGGETT
Pittsburgh 22
814 Park Bldg.

R. RAYMOND KAY
Los Angeles 28
2420 Chermoya Ave.

**Owned and Published by**
**CHILTON COMPANY**
**(Incorporated)**

OFFICERS AND DIRECTORS
**JOS. S. HILDRETH,** *President*
EVERIT B. TERHUNE — Vice-President
P. M. FAHRENDORF — Vice-President
JULIAN CHASE — Vice-President
THOMAS L. KANE — Vice-President
G. C. BUZBY — Vice-President
CHARLES J. HEALE — Vice-President
WILLIAM H. VALLAR, Treasurer
JOHN BLAIR MOFFETT, Secretary
HARRY V. DUFFY — T. W. LIPPERT
FRED V. COLE

GEORGE MAISWINKLE, Asst. Treas.

Chilton Editorial Board
PAUL WOOTON
Washington Representative

Member, Audit Bureau of Circulation

Member, Associated Business Papers

**Indexed in the Industrial Arts Index. Published every Thursday. Subscription Price United States, its Territories and Canada $8; other Western Hemisphere Countries $15; Foreign Countries $20 per year. Single copy, 35c. Annual Review Number, $2.00.**

Cable Address, "Ironage" N. Y.

Copyright, 1948, by Chilton Company (Inc.)

RYERSON TUBING BANK
Date Anytime
Pay to the order of Steel Tubing Buyer
Every Tubing Requirement
JOSEPH T. RYERSON & SON, INC.
Check No. 2558

# Draw without Restraint on Your Ryerson Tubing Bank

Are your tubing requirements measured in inches or miles? When you contact Ryerson you can be sure of prompt delivery in either case, because tubing stocks "on deposit" at Ryerson plants are the largest in the country. Low carbon, cold drawn tubing, both seamless and welded, is on hand in a wide range of sizes. Pump cylinder tubing, pressure tubes, stainless tubing, pipe and fittings—practically any requirement can be shipped on short notice.

You save purchasing time when you draw on large, conveniently-located Ryerson tubing stocks, and you simplify shop operations as well. Ryerson tubing meets high standards of size accuracy, concentricity and straightness; so machining time is cut to a minimum.

For help on questions of application or fabrication Ryerson is again the source. Experienced men who devote all their time to tubular products are on call at every Ryerson plant. They are well qualified to work with you.

So depend on Ryerson tubing service to pay off in prompt, personal attention to your requirements—and quick delivery of quality steel. Call the nearest plant for any type, size or quantity.

Joseph T. Ryerson & Son, Inc. Steel-Service Plants at: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles, San Francisco.

**OTHER PRODUCTS**

- CARBON STEEL BARS— hot rolled, cold finished, reinforcing
- STRUCTURALS
- PLATES
- SHEETS & STRIP STEEL
- ALLOY STEEL BARS
- ALLEGHENY STAINLESS sheets, plates, bars, etc.
- TOOL STEEL
- BABBITT METAL
- MACHINERY & TOOLS for metal fabrication

# RYERSON STEEL

The IRON AGE

100 E. 42nd ST., NEW YORK 17, N. Y.

ESTABLISHED 1855

o o o

April 29, 1948

o o o

THOMAS L. KANE
*Publisher*

o o o

T. W. LIPPERT
*Directing Editor*

**Editorial Staff**

News, Markets Editor T. C. CAMPBELL
Technical Editor ..... W. A. PHAIR
Metallurgical Editor ... E. S. KOPECKI
Machinery Editor ..... T. E. LLOYD
Art Editor ..... F. J. WINTERS
Ass't News, Markets Editor J. HIGHT
Associate Editor ... H. W. VAN CAMP
Associate Editor ..... E. L. SCHIMKO
Associate Editor ... A. D. STOUT, JR.
Associate Editor ..... T. S. BLAIR
Associate Editor .... W. V. PACKARD

o o o

Contrib. Editor ..... J. S. LAWRENCE

**Foreign Editors**

England (Contrib.) ..... F. H. HARLEY
49 Wellington St., Strand, London, W. C. 2, England

Canada (Contrib.) .... F. SANDERSON
330 Bay St., Toronto, Canada

Paris (Contrib.) ..... PIERRE BENOIT
59 Rue Manin, Paris XIX, France

**Regional News and Technical Editors**

G. F. SULLIVAN
Pittsburgh 22
814 Park Bldg.

D. I. BROWN
Chicago 3
1134 Otis Bldg.

JOHN ANTHONY
Philadelphia 39
Chilton Bldg.

EUGENE J. HARDY
KARL RANNELLS
GEORGE H. BAKER
Washington 4
National Press Bldg.

W. A. LLOYD
Cleveland 14
1016 Guardian Bldg.

W. G. PATTON
Detroit 2
103 Pallister Ave.

OSGOOD MURDOCK
ROBERT T. REINHARDT
San Francisco 3
1355 Market St.

R. RAYMOND KAY
Los Angeles 28
2420 Cheremoya Ave.

**Editorial Correspondents**

L. C. DEAN
Buffalo

N. LEVENSON
Boston

JOHN C. McCUNE
Birmingham

ROY EDMONDS
St. Louis

JAMES DOUGLAS
Seattle



# Phony Profits

THE American economy currently reveals some extremely disturbing symptoms. Although business in the aggregate reports sensational profits, these profits have apparently lost their classic appeal to investors. It is becoming increasingly difficult to market new common stock issues. Of new capital raised in 1945, $1.08 was raised through the sale of stocks for every dollar raised through the sale of bonds and notes. In 1946 venture capital amounted to 59¢ for every dollar of protected senior capital. In 1947 this had dropped to 35¢.

This reluctance of the investment dollar to take a risk position on the capital margin of enterprise is reflected in the stock market. The thirty industrial stocks that comprise the Dow Jones average can be bought at a price that is 9.5 times their 1947 earnings. At the market bottom in April 1942, these same stocks could be bought at 9.2 times earnings. At the lowest point of the 1938 depression, the averages sold at a price-earnings ratio of 9.4. On the other hand, these same stocks at their peak in May 1946 brought prices that were 22.8 times earnings, a level which approximates the 21.3 P/E ratio in September 1939.

When, in a period of booming business, with full employment and record levels of reported earnings, those earnings sell at depression lows, it betokens some deepseated malady in the capital market. In searching for the cause, two lines of exploration are open. Is the market on the edge of a collapse? Are the earnings phony?

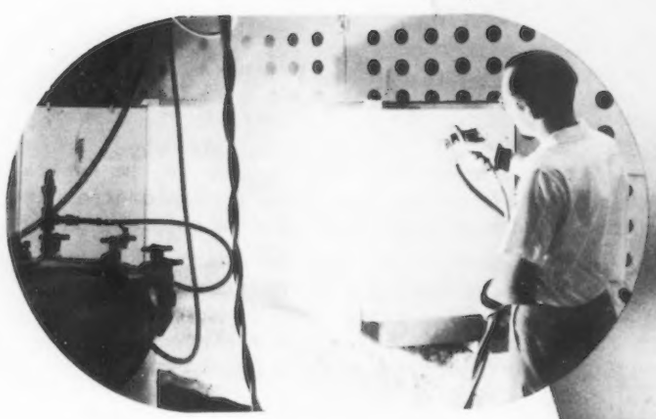
We believe the second question reaches the heart of the problem. Earnings are greatly overstated. Every item produced contains a quantity of raw material, labor, and a part of the plant equipment used in its production. Wages are reckoned at current levels; raw materials, particularly when last-in, first-out inventory accounting is practiced, fully reflect present cost. However, the fraction of the rolling mill or oil refinery consumed in the course of production is reckoned at original cost, which may have been incurred five, ten, fifteen or twenty years ago. Management must replace that consumed fraction of plant and equipment on the basis of present cost. It is in the failure to reckon capital consumption at current prices that reported profits become misleading.

During the 19 years from 1929 to 1947, total new construction and producers' durable equipment in the manufacturing industry amounted to $112 billion. If this construction and equipment were replaced in the present market, it would require an outlay of more than $187 billion. Assume that these overall figures reflect the rate at which the average manufacturer acquired his present plant and equipment. Every time such a manufacturer charges income with a dollar of depreciation, he is shortchanging himself another 67 cents. In other words, that fraction of plant and equipment consumed in manufacturing, which the accountants say cost only a dollar, must be replaced at today's prices for $1.67. Business is selling something for a dollar which it must repurchase for $1.67. It is not necessary to be an accountant or an economist to recognize that this is a sure road to loss.

Could it be that the market realizes this failure of adequate depreciation and is discounting reported earnings?

*Joseph Stagg Lawrence*

# *An INLAND DEVELOPMENT That DOUBLES Enamelers' Output!*



*Inland Ti-Namel sheets need only one coat to produce high-quality enameled products.*

That's just what Inland's revolutionary Ti-Namel steel sheets are doing right now. And here's why!

Ti-Namel — an Inland development — contains titanium which combines with carbon to provide an exceptionally stable enameling iron sheet requiring *only one coat of enamel.* Labor and equipment commonly needed for applying a ground coat, or additional finishing coats, are eliminated. This one advantage of Inland Ti-Namel saves many man-hours and cuts shop costs.

Because Ti-Namel makes possible the use of a thinner coat of enamel, chipping is reduced to a minimum. And high sag resistance makes flat Ti-Namel sheets *stay* flat.

Ti-Namel is one of Inland's production-proven developments providing industry with the steel to fit the job. INLAND STEEL CO., 38 S. Dearborn St., Chicago, Ill.

Sales Offices: Chicago, Davenport, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul.

INLAND STEEL

*...TI-NAMEL SHEETS...for Economical Enameling*

OTHER PRODUCTS: BARS • STRUCTURALS • PLATES • SHEETS • STRIP • TIN PLATE • PILING • FLOOR PLATE • RAILS • TRACK ACCESSORIES

► Not all the red tape which ERP encounters is going to be found on this side of the ocean. One company in Holland, importing sheet and iron from the U.S., reports it had to pay at least 22 kinds of costs, many of which were unknown in former times. The costs totaled 25 pct of the original invoice. Information regarding the sheet and iron required three lines and was supplemented by three pages treating the additional costs.

► Charging an admission fee of 5 lb of scrap, General Motors Corp. recently played host to 1400 children at a special movie in connection with the GM scrap drive. On an average the children lugged 12 lb of scrap each to the theatre. An unkind statistician has figured out that if each individual who has gone to Germany to investigate scrap possibilities had brought back a good sized hunk of the precious stuff there would no longer be a scrap problem.

► By building a complete blast furnace shell adjacent to the old unit and then moving it into place as one piece, a steel company has saved months in down time compared to the old rebuilding practice.

► A secret process applied to rolls used in continuous controlled atmosphere furnaces is reported to inhibit the pickup on rolls that sometimes damages sheet. At one mill where rolls handling high silicon sheet had to be taken out of a normalizing furnace and turned down at the end of 30 hr, the treated rolls are said to have run for 3 months without pickup.

► Trucks are competing with railroads for freight, right in the railroads' back yards. In Chicago one steel company reports it takes a week for a 50-ton tank car to make a complete trip from acid maker to steel plant and back. One truck operating three turns a day 7 days a week can deliver 1400 tons of sulfuric acid at lower hauling costs.

► Under agreement with Great Britain, France will supply England with semis, starting with 40,000 tons and increasing proportionately to 200,000 tons a year when French production reaches 10 million tons.

Meanwhile, Societe Metallurgique de Normandie will receive $4 million credit to enable them to buy plant, mainly rolling mill equipment, in Great Britain. This will be used for reconstruction of the Mondeville works, severely damaged during the war. The credit will be repaid by shipment to the British Whitehead Iron and Steel Co. of steel billets above amount provided in the general agreement.

► Delivery dates on substantial tonnages of conversion steel will have to be extended because shipments of semifinished steel were interrupted during the coal stoppage. Interruptions in the flow of pig iron to some Detroit plants were reported even before that. Result is that badly unbalanced inventories pose a serious threat to some plants.

► A big hindrance to steel producers trying to trace their structural products, which somehow end up on the gray market, is lack of identification. Gray marketeers often grind off the company name, symbol or rolling date which is embossed on the shape when rolled. Without this identification, tracers are up against a stone wall.

► Integrated steel producers are fearful lest ERP requirements in semifinished steel take the product away from their finishing mills. These producers recommend the ingot makers who do not have finishing mills be asked to furnish such tonnages first. This plan would cut deeply into the complicated conversion deals.

► Czechoslovakian industrialization plans call for the erection of blast furnaces with a capacity of 500,000 tons of pig iron per year. Half the ore needed would be drawn from Slovakian mines and the rest from Soviet Russia. Presence of 20 million tons of ore of high iron content in Slovakia is claimed, with up to 300 million tons if reserves of less than 30 pct. Fe are considered.

► The export tax on manganese ore from India has been set at 25 pct ad valorem. This reduces consumer opposition to the tax on the basis that the formerly established 20 Ruppee per ton tax penalized consumers of low grade ores. Although domestic consumers are still opposed to the new export tax, threats to boycott the market would be ineffective should Russia cut off their exports to us.

► One of the big railroads is planning to equip all its dining cars with stainless steel from end to end--everything from the kitchen sink to the cutlery.

# The Openhearth Furnace –

By J. H. CHESTERS

*Research & Debelopment Dept., United Steel Cos., Ltd., Stocksbridge, England*

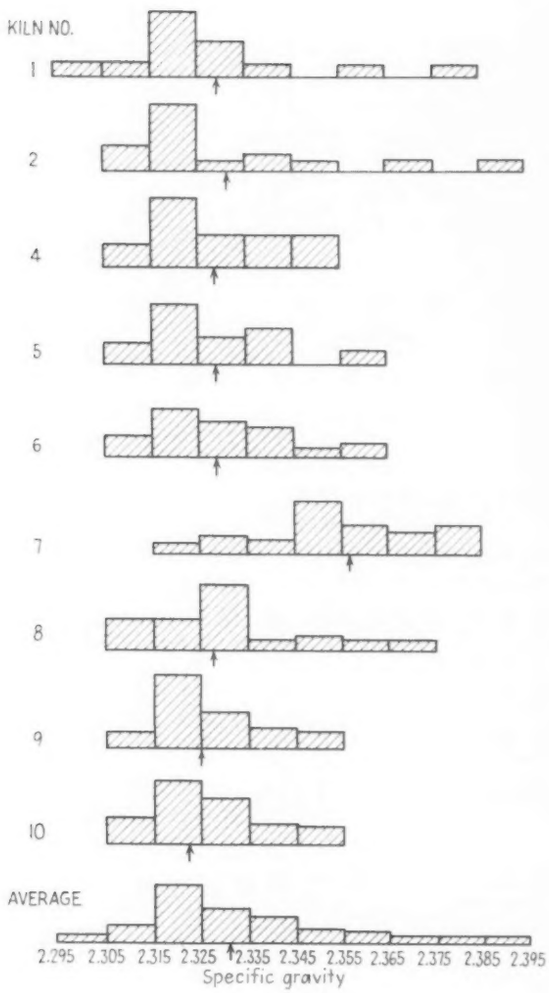



*FIG. 1 - Kiln to kiln variations in specific gravity of silica bricks.*

THE nonavailability of certain chrome ores and magnesites during the war years led to an almost complete cessation in development of the all-basic furnace, except in Germany. In this latter country Austrian magnesite was employed in conjunction with Turkish or Grecian chrome ore to produce special chrome-magnesite bricks, although chrome subsequently became so short that straight magnesite bricks of extremely coarse texture were used instead.

Although economic conditions are still far from normal, considerable interest is being shown, particularly in Canada, the United States and Great Britain, in the development of the all-basic furnace, and great progress is expected within the next few years.

In spite of this competition, the virtues of silica bricks and in particular their small reversible expansion above 600°C (1112°F) and their ability to carry a considerable load to within a few degrees of their melting point will insure the continued use of silica bricks in openhearth furnace roofs for many years to come.

The faster working of furnaces, which comes partly from a desire to make up wartime deterioration and partly from a desire to reduce production costs, has led to the virtual disappearance of "phenomenal" roof lives and a general scaling down to a typical average figure of 3 to 6 months. The change in attitude is so definite that operators priding themselves on roof lives of a year or more are liable to be criticized for not making full use of their furnaces. The results of a recent series of furnace trials[1] strengthen this attitude since they show that an increase in average roof temperature of only 10°C (18°F) may have a marked effect on the net downward heat flow in a furnace and hence on the melting rate.

It can, however, be stated with some confidence that even with such fast driving of furnaces, an average increase in roof life of at least one third could be obtained in most shops without the necessity of redesigning furnaces or any sacrifice in production. All that is required is a more thorough application of existing knowledge of the properties of silica bricks

# *Making the Most of Silica Roofs*

***Predicting that silica will continue to hold its place in the manufacture of openhearth roofs for some years to come, in spite of the growing interest in basic refractories, the author discusses various methods for improving the performance of silica bricks. In this, the first part of a two-part article, techniques are suggested whereby the quality of silica bricks can be improved by the manufacturer, especially from the standpoint of reducing the spread in physical properties from brick to brick. The author also presents some interesting observations relating to the causes and prevention of spalling.***

and a more conscientious and complete control of furnace variables, notably roof temperature and furnace pressure.

There has been comparatively little improvement in the quality of silica bricks during the last decade; indeed the opinion is frequently expressed that brick quality has deteriorated. A notable exception is the super-duty silica brick developed in the United States during the war years. A study of the sources of raw material in Great Britain indicates the difficulties facing the manufacturer. The more accessible ganister seams, which at one time provided sufficient silica at a fairly reasonable price, are now largely worked out, and recourse must be had to massive quartzite deposits. Although there are great quantities of silica-rich rock in Great Britain, the bulk of it is seriously contaminated by felspar and other impurities, and it is extremely difficult to obtain material with an alumina content of much below 1 pct. A more fundamental difficulty facing silica brick manufacturers, whether in Great Britain or in the United States, is that even the poorer grades of brick have generally been made of quartzite of 96 pct silica content or over and any further improvement in quality cannot be expected to have a very great effect on the melting point of the product. With the average standard of roof temperature control an improvement in refractoriness of say 20°C (36°F) can easily be swamped by variation in operating conditions; but given sufficiently good control such an improvement would be of considerable value to the steelmaker.

The obvious attack on this problem is the use of extremely pure quartz, e.g. high grade sand. Such sands are now employed by the steel trade, in the fettling of acid openhearth furnace bottoms, for example, but there is a general feeling in the brick trade that it is virtually impossible to make a first class silica brick using sand as the principal raw material. There are of course obvious difficulties, notably that of obtaining a dense packing when using a maximum grain size of say 1 mm (0.039 in.) and the possible silicosis hazards that might arise from the addition of silica fines to lower the porosity. This line would, however, appear worth pursuing further if only so that we might know *why* such bricks would not be satisfactory. The usual contention is that they would be porous and weak, but surprisingly little appears to have been published to justify such statements.

The most promising line of development at the moment is that being pursued in the United States in connection with the production of super-duty silica bricks. For this purpose a pebbly conglomerate is crushed and washed to give a raw material containing less than 0.5 pct alumina, alkali and titania. Sufficient information has already been collected to show that the use of such material offers definite advantages given the necessary adjustment in brickmaking technique, but it is still to be shown that suitable raw materials are available in all countries making silica bricks. The new process does at least serve to emphasize the need for selection and washing of rock. This is now standard practice at many works, but there is still much room for improvement in the amount of quality control employed. The main

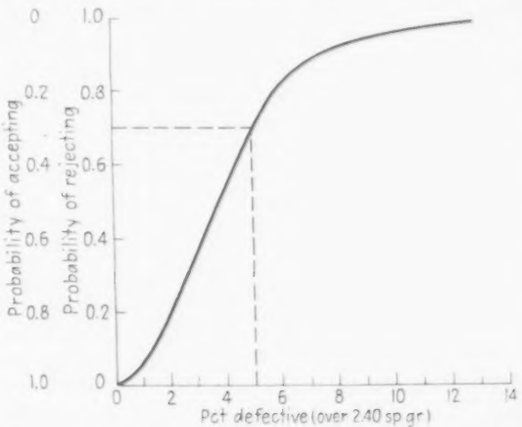



*FIG. 2 - Probability of acceptance or rejection of a load of bricks with a given percentage of defectives. Sample size was four bricks from each load.*

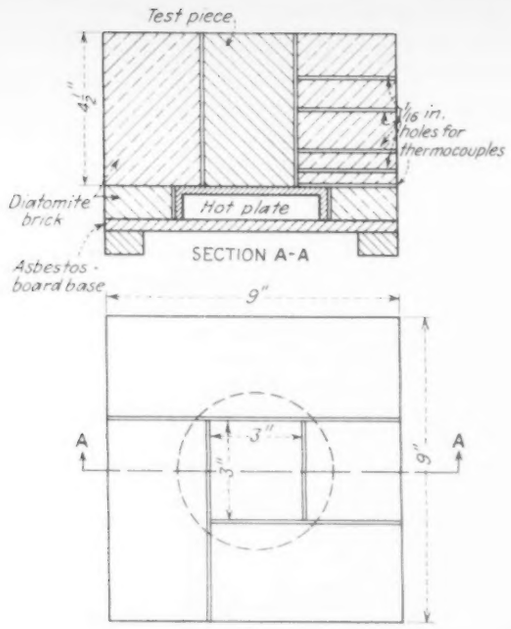



*FIG. 3 - Sketch of apparatus used for spall tests on silica bricks.*

factor, alumina, frequently escapes such control because of the difficulty of obtaining a reliable and quick method of analysis. Recent work in the United States on the use of spectrographic methods of alumina determination is very encouraging and may ultimately offer a means of control at least to the larger manufacturers.

An alternative to traditional brickmaking would be the production of fused silica blocks. This has been attempted in Russia and the reports available suggest that longer lives would be obtained with such blocks, though at a very much greater cost. The extraordinary way in which a pure fused silica sheath, as used for temperature measurement, "will stand proud" of a silica roof when the latter wears back, confirms the idea that pure silica of zero porosity would have considerable slag resistance.

## Sampling and Testing Silica Bricks

The problem of sampling silica bricks is one that has never received sufficient consideration. No one who has studied such questions seriously expects to get 100 pct of *good* bricks in every delivery. What really matters is whether the percentage of "good" bricks is high and whether it is increasing or decreasing with time. To achieve any satisfactory results such a study must be made from the dual angle of the brickmaker and the user. Silica bricks are subjected to acceptance testing, but only a small proportion can be checked, and it is important that the sampling procedure should be such as to give results that bear a significant relation to the quality variations in the brickworks.

Results of a preliminary study of this problem were recently revealed by W. T. Hale.[2] The choice of specific gravity as the first stage in quality control of silica bricks was made because it has been found over many years that a considerable amount of trouble arises due to the inclusion in roofs or side-walls of groups of bricks of abnormally high specific gravity and therefore of high after-expansion. The specific gravity of quartz (2.65) is reduced by normal hard firing to about 2.32. While bricks of, say 2.36, sp gr might give equally good or better lives in the openhearth furnace roofs than bricks of 2.32 sp gr, experience shows that the spread in specific gravities is always greater with a softer-fired brick, and it is this spread rather than the absolute value which leads to trouble. The significance of specific gravity in connection with openhearth furnaces is discussed later in this article.

An investigation was made of ten kilns of

*FIG. 4 - Typical specimen after spalling test, showing cobblestone type of fracture; rate of heating 17° C (31° F) per min.*

silica bricks in one works, in which specific gravity determinations were obtained at three levels in the kiln and at a number of positions in the horizontal plane. This revealed the expected top to bottom variation and the usual soft firing at the wicket position. The spread of results obtained for each of the ten kilns is shown in fig. 1.

It will be seen that each kiln shows a single-humped histogram of roughly the same shape, the main difference being in the position of the average value (indicated by the arrow). For each of the kilns the histogram shapes are based on 15 bricks, which is not a very large number but is sufficient to indicate the general trend. The immediate object of the investigation was to develop a method of sampling which would insure that consignments containing more than 10 pct of bricks of specific gravity over 2.40 would be rejected, with only a 5 pct risk (1 in 20) of wrong acceptance. The solution will obviously depend on the quality control existing in the particular brickworks.

The conclusion was that the following procedure should be adopted for the particular

works studied. Four bricks should be taken from each load and the specific gravity of each brick measured and recorded. If the average specific gravity of the four samples was less than 2.365, the load should be accepted; if greater than 2.365, it should be rejected. Space does not permit of a description of the statistical analysis that led to this decision, although this is given in some detail in Hale's paper. The final position regarding makers' and users' risks is summarized in fig. 2, which shows the probability of accepting or rejecting a load of bricks with a given percentage of defectives.

The sampling scheme has now been in operation for some time at a number of steelworks and would appear to be giving satisfactory results. Its extension to other manufacturers is in hand. That such statistical methods are of value has been widely confirmed during the last few years in the field of refractories; the information obtained being of far greater value both to the maker and the user than the normal list of figures or averages. Thus repeated trouble due to breakouts from bottom pouring setups was traced to the fact that the average size supplied by one maker was too small and that of another too large. Both showed the same degree of variability and small changes in mold sizes were sufficient to bring the trouble under control.

Other properties of silica bricks considered worthy of routine checking are as follows:

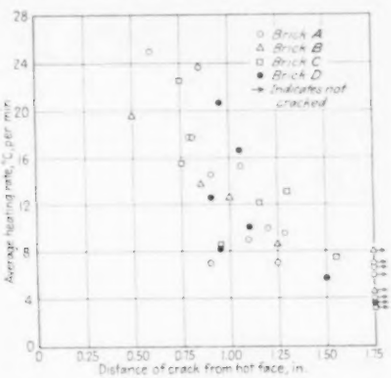



*FIG. 5 - Relationship between heating rate and distance of the crack from the hot face in the range 220° to 270°C (428° to 518°F). Tests performed with dry specimens.*

**Chemical analysis—particularly alumina content, which with the other fluxes determines the liquid content of the brick at the working temperature.**

**Bulk density—which measures the amount of silica that must be dissolved away to give a fixed thickness of wear.**

The importance of chemical analysis has been stressed by a number of writers, e.g., Birch and Kraner in the 1944, AIME, Open Hearth Proceedings. The split roof technique recommended by Kraner for the comparison of silica brick quality is one that could be used to advantage over a much wider field, provided the variation within batches is of a lower order than that found from batch to batch.

Although the peculiar expansion properties of silica bricks have been known for a long time, there are still very few plants in which openhearth furnace roofs are heated up under adequate control. Suggested maximum safe rates of heating are available, but their acceptance is discouraged by the lack of any theoretical background for the rates given. One of the difficulties is the extreme sensitivity of silica which rules out the use of normal spall tests. Quite recently T. W. Howie[3] published the results obtained with a new type of laboratory test, which is understood to have also been attempted in the United States. This test consists essentially of heating up either a full brick or a suitably shaped test piece on a hot plate (fig. 3) and finding the maximum rate at which the face temperature can be raised without causing cracking of the test piece. For most of the work a specimen $4\frac{1}{2}$x3x3 in. was used, set with the 3x3-in. face on the hot plate. The temperature at the hot face and at various distances behind it was measured by means of base metal thermocouples placed against the test piece and introduced through 1 16-in. holes in the surrounding diatomite bricks. Results obtained subsequently with full size (9x$4\frac{1}{2}$x3 in.) bricks gave very similar results, probably because it is only the first few inches that have time to heat up during the test period.

[1] *J. H. Chesters and M. W. Thring, Iron & Steel Institute Special Rept. No. 37.*
[2] *W. T. Hale, Trans. Brit. Ceram. Soc., 1947, 46, p. 147.*
[3] *T. W. Howie, Trans Brit. Ceram., Soc. 1946, 45, p. 45.*

Fig. 4 shows a typical sample after the spall test; the crack being always furthest from the hot face at the corners of the brick. The irregularities in the line of the crack are doubtless due, in the main, to interference by coarse grains. As the heating curves obtained were not linear, the average heating rate in the range 220° to 270°C (428° to 518°F)—alpha to beta cristobalite inversion—was chosen as a basis for comparison.

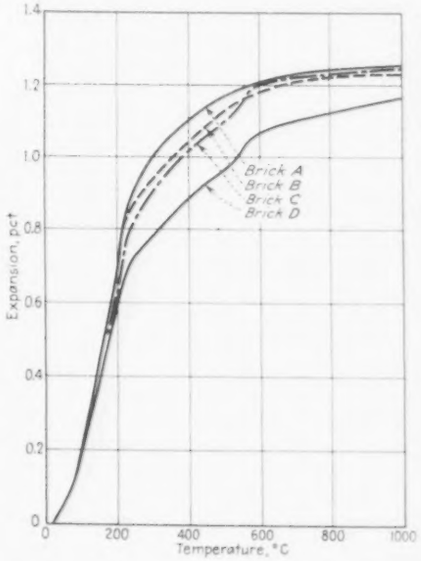



*FIG. 6 - Thermal expansion curves of silica bricks used in spall tests.*

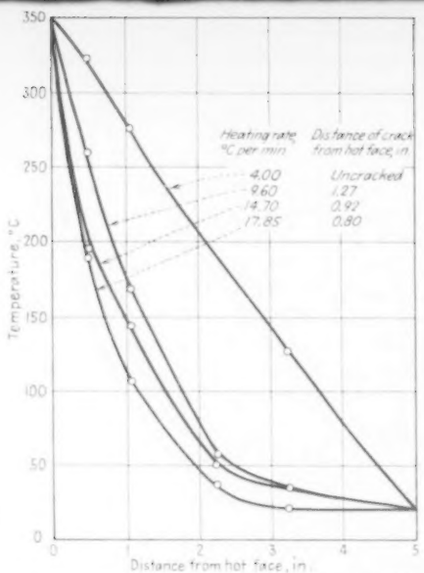



*FIG. 7 - Temperature gradients for different rates of heating in the range 220° to 270°C (428° to 518°F). Hot face 350°C (662°F).*

Four sets of test bricks were employed in the early work:

Brick A—fine grained, hard fired (2.32 sp gr), negligible residual quartz.

Brick B—coarse grained, slightly softer fired than brick A; 10 pct residual quartz.

Brick C—slightly softer fired than brick B; 15 to 20 pct residual quartz.

Brick D—medium fired (2.37 to 2.39 sp gr); 25 to 30 pct residual quartz.

The first observation, and one which is of direct practical significance, is that the distance of the crack from the hot face decreases as the rate of heating rises. In other words, if the rate of heating is just sufficient to cause a crack to form, the crack is likely to be well into the brick, whereas if much faster rates are employed, comparatively thin pieces of material will tend to spall off. This tendency is seen when a cold silica brick is used to cover a hole

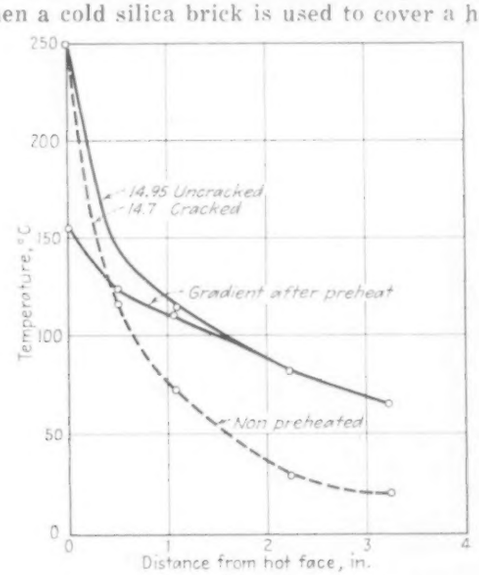



*FIG. 8 - Effect of preheating on temperature gradients through silica bricks in the spall test. Heating rates of 14.95 and 14.7°C (26.91° and 26.46°F) per min were taken in the range 220° to 270°C (428° to 518°F).*

in a roof. Thin flakes, almost like razor blades, tend to fly off almost immediately.

The importance of this observation is mainly in the light which it throws on delayed spalling. It is quite common for a melting shop manager, or furnace operator, to state that spalling observed, say 2 to 3 weeks after the furnace went into operation, cannot be due to improper heating up. If, however, the heating rate has not been sufficient to cause an immediate "raining" of 1-in. thick pieces from the underside of the roof during the heating up period, it may simply mean that the cracks are much deeper in the bricks and that some local movement, or melting, is necessary before the weakness is revealed. Once an odd half-brick or two have dropped out others are free to move and thus "delayed" spalling can take place.

Fig. 5 shows the relationship between the heating rate and the distance of the crack from the hot face for the four bricks described above, whose thermal expansion characteristics are shown in fig. 6. It will be seen that none of the bricks cracked with a heating rate as low as 4°C (7.2°F) per min, but that several of them cracked with a heating rate of 8°C (14.4°F) per min. It would appear that the heating rate of say 5°C (9°F) per min, or

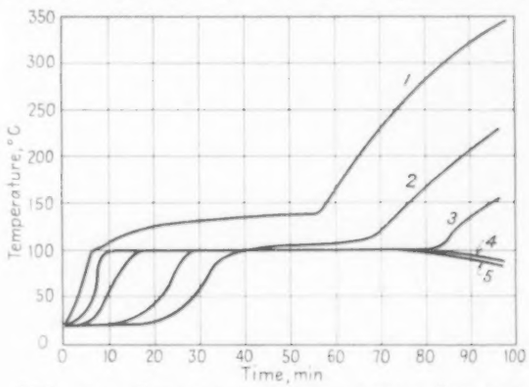



*FIG. 9 - Typical heating curves for wet specimens. Heating rate at the hot face, in the range 220° to 270°C (428° to 518°F), is 5¼°C (9.9°F) per min. Curve (1) at hot face, and curves (2), (3), (4) and (5), respectively, represent locations on the brick at 1/2, 1 1/16, 2¼ and 3¼ in. back from the hot face.*

300°C (540°F) per hr, represents the absolute maximum rate for the heating up of silica bricks from one end if spalling is not to occur. For the softer fired brick D, the maximum rate is nearer 8°C (14.4°F) per min. It was not possible in these experiments to determine the exact time at which the crack occurred, but it was noted that cracking could be heard to take place when the hot face was in the range 220° to 270°C (428° to 518°F). It would appear that cracks are mainly the result of the alpha to beta cristobalite inversion, but that the crack itself takes place at a point in the brick at a much lower temperature.

Fig. 7 shows a typical set of temperature gradients through the brick for different rates of heating, all taken at the time when the hot face had reached 350°C (662°F). The distance of the crack from the hot face is indicated for each curve, and it would appear that the cracking occurs in the vicinity of the maxi-

mum inflection which approaches the hot face as the rate of heating increases.

Fig. 8 shows the effect of preheating the test piece on the temperature gradient and suggests that any slow warming up of the roof that can be achieved before the rapid heating up begins will be advantageous in reducing spalling. This can sometimes be achieved by draughting heat from the checker chambers.

The effect of wetting the brick on the temperature gradients is shown quite vividly in fig. 9. It was found that only half the rate of temperature rise is required to crack a wet brick. This is in line with sad experience, excessive spalling having accompanied the use of wet bricks stored in the open air. The presence of the water causes a break in the heating curves at 100°C (212°F), the relatively slow heating rate at the hot face, between 100° to 140°C (212° to 284°F) being attributed to water or steam coming from the cooler part of the brick. Once this stage is passed the brick heats up rapidly at the hot face with a consequent increase in the spalling risk.

Analysis of such curves shows that the temperature gradient near the hot face is much steeper, and the inflection nearer to the hot face with a wet brick than with a dry one. Studies made of bricks soaked in creosote confirm the practical experience that such treatment reduces the spalling risk.

Another observation, which at first seemed in contradiction to the above findings, is that plunging of silica bricks in water prior to use for repairs to door jambs, etc., has been claimed as beneficial. Tests in which pieces of brick

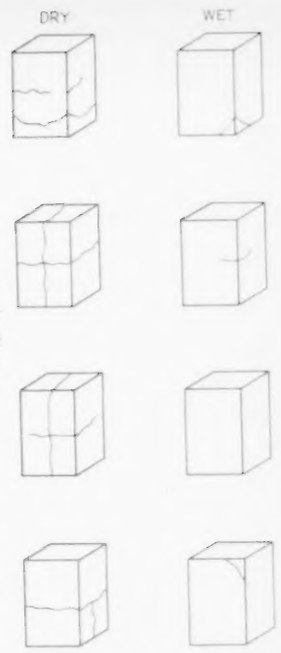



*FIG. 10 - Comparison of the extent of spalling using wet and dry specimens in the small prism. Thermal shock test.*

(see fig. 10) were heated up on all sides by placing them in a furnace confirmed that under these very different conditions dry bricks tend to spall more readily than wet bricks. This is presumably due to the slower heating up of the brick as a whole, due to the heat required to evaporate the water.

***In a subsequent issue, the author will discuss measures that can be taken by the openhearth operator in improving the efficiency of the silica roof.—Ed.***

## Detergent Additions Improve Pickling Bath Efficiency

PICKLING time for hot rolled steel has been reduced from 20 to 30 pct, acid and neutralizer are conserved, and fumes and gassing are practically eliminated by addition of a synthetic detergent called Nytron to pickling baths at Newport Rolling Mill, Div. of International Detrola Corp., Newport, Ky.

The detergent, a complex organic sodium sulfonate designed as a wetting and washing agent, was developed by Solvay Process Co., New York.

The Newport plant uses three tanks in series. The first tank is for 8 pct sulfuric acid, the second contains 6 to 7 pct sulfuric and the third is a soda ash neutralizing solution. Each tank holds about 3500 gal and standard practice in the past has called for a 15 min time cycle per tank, or 30 min total pickling time with 15 min for rinsing.

Addition of Nytron to the first tank only in the series arrangement has allowed reduction of the time in each tank to approximately 10 min, or a one-third saving. Enough of the detergent has been found to be carried over with the work from the first to the second tank to make additions there unnecessary.

Wetting action of the detergent reduces the surface energy of the interface between the metal and pickling solution and thereby reduces the thickness of the film of moisture on the work when it is removed. As a result acid drag out has been decreased so that less acid is required for make up and at the same time neutralizer is conserved since there is less acid introduced with the work into the soda ash solution.

When a new pickling solution is made up, 2 lb of Nytron are added for the 3500 gal quantity. Consumption has run about 1 lb of detergent per 6 tons of sheets pickled and additions are customarily made after every 3 or 4 batches of steel. This figure is only an approximation since surface areas and analyses vary, but it is indicative of the quantities involved. Cost of the detergent is about 15¢ per lb.

A 4 to 5 in. blanket of foam is maintained on the bath which practically eliminates gassing to effect improved working conditions and a saving in acid.

Use of the Nytron at Newport has been limited to pickling hot rolled steel with a heavy oxide scale and is not used in their finished sheet pickle. Nytron has a rather weak inhibiting action which has made its use for some grades of steel inadvisable, and for other grades which require comparatively strong inhibitors it proves unsatisfactory since, foaming power is lost in the presence of petroleum-derived inhibiting agents.

Detergent additions are said to be particularly valuable and time saving when work is oily or greasy as deeper and faster penetration by the acid is possible.

# High Temperature Materials

By CLAUS G. GOETZEL
*Vice-President and Director of Research,*
*Sintercast Corp. of America,*
*New York*

***The need for more-refractory alloys in the manufacture of parts to be subjected to service at high temperatures has created the requirement for a new material development free from the limitations imposed by casting and forging. Of several powder metallurgy procedures possible, the so-called infiltration technique appears to be the most promising. The author discusses the metallurgical advantages of this method as applied to the use of refractory metals and hard metallic compounds, and projects his study into the realm of oxides and ceramic components.***

HIGH-TEMPERATURE materials are of extreme importance today. The future of the combustion engine, the gas turbine, the jet turbine, and even, perhaps, the efficient utilization of atomic energy, rest upon the ability to construct working parts and housings that will function at higher and higher operating temperatures—up to, and beyond 2500° F. And at those temperatures the new materials must have strength, resistance to creep, resistance to impact and heat shock, corrosion resistance (to products of combustion and lead vapors and oxygen), and sufficient hardness to resist the abrasions and erosions of extremely high-speed gas streams.

To combine such properties is quite a task; one which the mechanical engineer, the power engineer and the atomic engineer are anxiously waiting for the metallurgist to fulfill.

Nor is the whole problem one of turbine blades, jets, venturis, and valves, used at extremely high temperature. If more durable and serviceable materials for high-temperature usage are forthcoming, these same materials will very likely offer longer service lives at the lower temperatures and thereby benefit the entire field of heat-enduring materials. Here the furnace engineer, the combustion engineer, the automotive engineer, and the general power engineer are waiting alongside the high-temperature specialist.

Metallurgy has already done much in this direction. But what it has done so far is largely through alloys which are shaped by casting or forging processes; Vitallium, Inconel, Multimet and austenitic high alloy steels are examples. There is not, however, very great promise for going further in this direction. The reason lies in the short span between the temperatures at which the alloys are cast or forged into useful shapes and the temperatures at which the finished parts must perform in service.

*For a description of the infiltration technique as a method for making various components, see "Cemented Steels," The Iron Age, May 2, 1946, p. 50.*

# by Powder Metallurgy

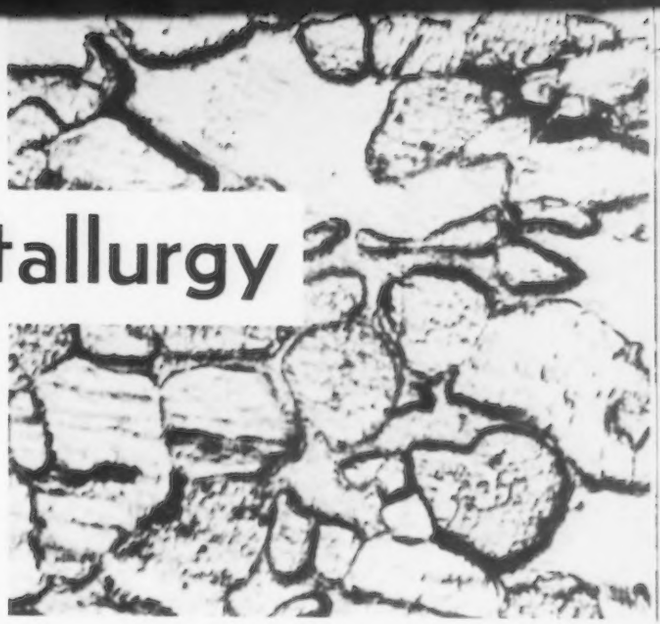


*FIG. 3 - Photomicrograph of a sintered and hot-forged tungsten-nickel alloy containing about 90 pct tungsten. 200X*

Accordingly, industry has looked toward more refractory alloys. A notable recent success is a chromium-molybdenum-iron alloy (CM 469) which when cast under vacuum is suitable for use at temperatures probably as high as 2500°F and certainly at 2000°F. But even these temperatures will be below those expected in the engine of tomorrow. In addition, the strength-weight ratio is to be watched. Also, this approach is running afoul of embrittlement difficulties at ordinary and elevated temperatures. Therefore, a new material development free from the limitations imposed by casting (fluidity) and forging (plasticity) is needed.

Through powder metallurgy, new combinations of metals may be tried, which involve material not easy to fuse for alloying: molybdenum, tungsten and tantalum are examples. Their high boiling temperatures and moduli of elasticity are such that they promise high creep and rupture strengths along with highly desirable refractory characteristics. The change of the tensile strength with rising temperature is shown for tungsten and molybdenum in fig. 1.[1] These metals may be cold pressed and sintered by techniques standardized during the past 50 years. Unfortunately, however, they are not very resistant to gaseous attack and corrosion at the elevated temperatures encountered in turbines and jet engines.

Partial solutions have been found in protective coatings of the parts thus produced. Chromizing, siliconizing and calorizing, and even ceramic coatings, have been tried, and encouraging results have been obtained in certain cases. But the hazard of spalling under the mechanical and thermal strains of abrasive abuse at high temperatures limits the likelihood of great success.

Another means of imparting corrosion resistance to powder metal parts made from refractory metals is to strive for compositions that are corrosion resistant by nature. Parts have been made from alloy powders and mixed powders, principally in the nickel-cobalt-chromium combination, but most of these still require special corrosion-

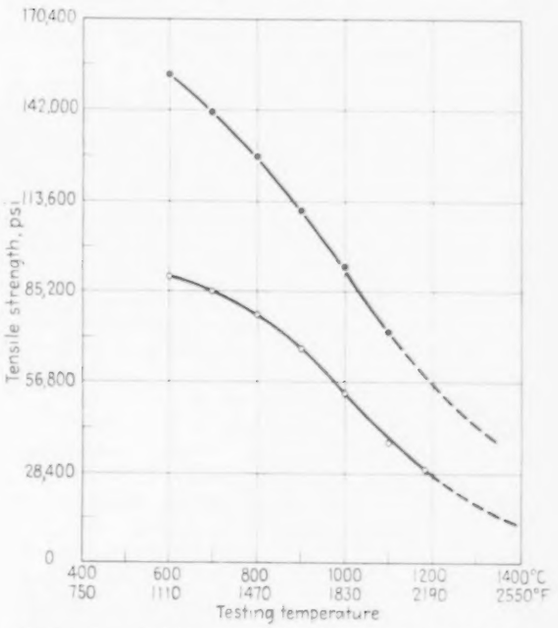



*FIG. 1 - Effect of temperature on the strength of wrought tungsten and molybdenum (according to Kieffer and Hotop).*[1]

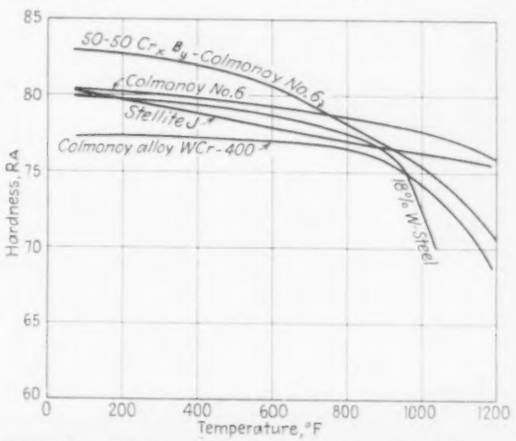



*FIG. 2 - Effect of temperature on the hardness of various refractory alloys.*

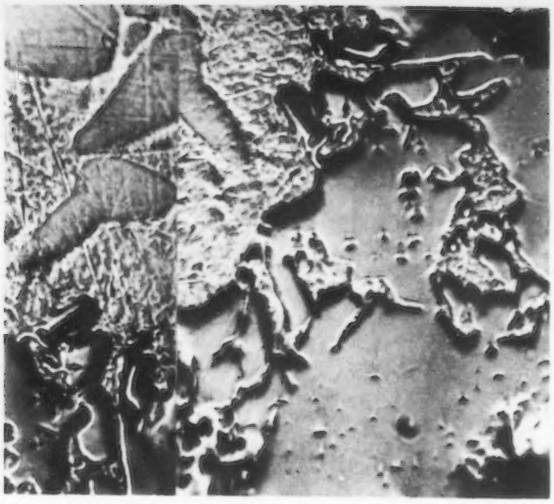


*FIG. 4 - Photomicrograph of a hot-pressed chromium boride-nickel alloy containing about 80 pct chromium boride. 500X*

resistant surface treatments with chromium or other elements.

The most interesting group of promising materials are the so-called hard compounds, made into parts by powder metallurgical processes. They are strong in the formed and sintered state and are more erosion and abrasion resistant than pure refractory metals at the same temperature. Some are considerably more corrosion resistant than the pure refractory metals. Sintered double-carbide of tungsten and titanium, which is harder and stronger than sintered tungsten (though scarcely stronger than sintered tungsten later drawn and worked into wire) is a familiar example.

The following compounds have been experimented with to a varying degree; chromium boride, molybdenum boride, titanium boride, tentalum carbide, columbium carbide, titanium carbide, and, of course, tungsten carbide. The last two are the least promising of the group, for the reason that tungsten carbide is not very corrosion resistant above 1650°F, and titanium carbide decomposes in the presence of oxygen at about 2100°F. Actual jet and turbine components such as buckets have, however, been made on an experimental scale, and also, a rather oxidation-proof cemented titanium-carbide material (K-138) has recently been developed[2] which has remarkably good properties at elevated temperatures, as shown in table I.

[1] *R. Kieffer and W. Hotop, "Pulvermatallurgic u. Sinterwerkstoffe," Springer, Berlin, 1943, p. 252.*

[2] *"New High Temperature Material," The Iron Age, Nov. 27, 1947, p. 86.*

Chromium boride is the only one of the remaining compounds that has been sufficiently explored to permit specific discussion. There are a number of borides of chromium, all at least as resistant to oxidation and chemical attack as pure chromium, and with basic hardnesses which practically match that of tungsten carbide. Their hardnesses diminish only very slightly up to the temperatures now employed in turbines and jet engines as shown in the diagram of fig. 2, for some alloys containing chromium borides. They are highly soluble in such metals as nickel, iron, cobalt, or chromium, so that the latter materials may be used as cementing agents. Moreover, their specific gravity is low (which is desirable) and most of the pure compounds will not melt until their temperatures increase well beyond the 5000°F range.

## Powder Metallurgy Techniques

Powder metallurgy offers three different ways of converting these refractory metals and hard compounds into finished parts:

(1) *Cold pressing and subsequent sintering.*—Here, very high molding pressures, up to 30 tons per sq in., are required. Further, the sintering must be performed at elevated temperatures, 2500° to 3000°F, depending upon the particular composition of the alloy. As indicated above, powders of cobalt, nickel, iron, chromium, or other alloys, may be mixed with the refractory metals or hard compounds before pressing and sintering in order to act as cementing agents. The content varies in general from 3 to 20 pct; thereby the refractoriness of the alloy is retained. Fig. 3 is a photomicrograph of a sintered and subsequently hot forged tungsten-nickel alloy, containing about 90 pct tungsten, with nickel admixed to the tungsten before pressing.

(2) *Hot pressing.*—By this method the pressing and sintering processes are combined and performed at the same time. The applied heat develops greater plasticity of the powders and allows the use of lower forming pressures (1000 to 2000 psi). Graphite molds may be used, which is an advantage in the case of the carbide-type hard compounds, for reasons of obtaining a protective atmosphere. After the part is formed another sintering at higher temperatures may be done to complete the alloying and the fusion of components. Fig. 4 is a photomicrograph of a chromium boride-nickel alloy containing about 80 pct of the refractory compound, and obtained by hot pressing a mixture of the boride and nickel powders.

(3) *The infiltration technique.*—In this case a porous skeleton is formed of the refractory metal or hard compound phase, and thereafter molten materials of adequately high fusion point are drawn by wick action into every pore and interstice of the sintered skeleton. The advantage of this method lies in the lower forming pressures that may be employed, it not being necessary or even desirable, to reduce the porosity of the original sintered part to a minimum. Only a small percent, if any, of the cementing agent may be mixed in with the original hard compounds. The remainder of the cementing material constitutes the impregnant or "infiltrant". Fig. 5 is a photomicrograph of a molybdenum skeleton body infiltrated with a cobalt-base alloy, the latter amounting to about 20 pct of the total volume.

It is this last of the three techniques for handling the refractory metals and hard metallic compounds which promises the greatest success close at hand.

There are many encouraging facets to the infiltration technology:

(1) The skeleton manufactured before infiltra-

tion is a continuous matrix, and so is the pore system which is later filled with the infiltrant. With both systems being continuous, a lesser opportunity for points of cleavage is presented.

(2) There is better controllability of grain size, and the possibility of developing uniformly large grain sizes by heat treatment of the parts after infiltration (which may prove to be of great importance from the standpoint of hot strength and creep resistance).

(3) There is the possibility of economies in production by using a single investment mold both for forming the original sintered skeleton and for making the subsequent infiltration.

(4) As mentioned above, the low forming pressures (possibly coupled with dynamic types of loading, (air-hammer fashion) of the sintered skeleton save much in cost of equipment. Porosity within the skeleton part is desirable, provided it is uniform throughout the part.

(5) There is also the advantage of making complicated shapes by keying together simpler sections and heating the assembly so that the infiltrant fuses and welds the simple shapes together.

(6) There is the great advantage of using, to some extent, the technique of precision casting (centrifugal casting, vacuum casting, gas pressure casting) as a means of introducing the infiltrant into the skeleton. Thereby the advantages of precision casting are introduced to bolster the merits of the powder metallurgy technique.

And, finally, even the limited amount of testing which has been done shows the possibility of using a slight excess of the infiltrant so that it spreads thinly over the entire surface of the part, thereby effectively surfacing it with corrosion-resistant material. It must be noted in this connection that the coating is continuous and entirely merged with the matrix of infiltrant which previously has permeated the interconnected pore system of the skeleton. This may very likely be a most important factor in preventing spalling.

As the latest, and most fascinating, opportunity in the direction of powder metallurgical techniques for the production of high-temperature materials with superior service characteristics, one can look beyond the refractory metals, and beyond the hard metallic compounds, into the realm of oxides and ceramic components. It is already known that specific oxides such as alumina can be combined effectively with such metals as nickel and cobalt, possibly with the aid of intermediate bridging metals such as molybdenum or tungsten. The powder metallurgist is enticed into an enormous field of worthwhile research and development, covering other ceramic raw materials as possible constituents; new bridging materials which will combine both with the ceramic skeleton and the metal or alloy infiltrant; and many different compositions which can be used as infiltrant alloys. One "cerametal" material has already been introduced, though infiltration technology is not employed in its production. Here, ceramic oxides are mixed with chromium metal and alloys, and the whole processed following ceramic practice. Insofar as the author knows, no true ceramic skeleton infiltrated with refractory metals by the technique previously described has yet emerged past the laboratory door.

TABLE I

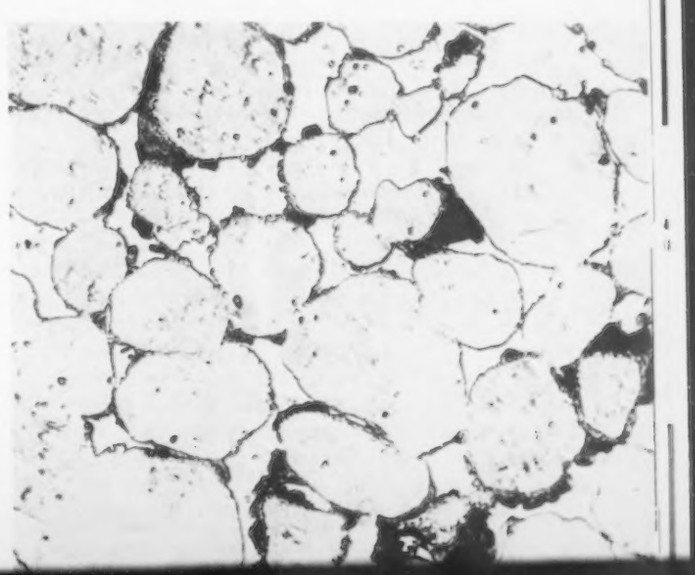
Properties of K-138

| | |
|---|---|
| Transverse rupture strength (room temperature), Psi | 175,000 to 210,000 |
| Transverse rupture strength (1800°F), Psi | 100,000 |
| Tensile strength at 1800° to 2000°F, Psi | 15,000 to 21,000 |
| Young's modulus of elasticity, Psi | 55,000,000 |
| Hardness Rockwell A scale | 91.0 to 92.0 |
| Specific gravity | 5.5 |
| Thermal expansion | 5.0 x $10^{-6}$ per °F. (300°-1200°F) |
| Thermal conductivity, calories per sec per °C per cm | 0.085 |
| Electrical conductivity | 5.0 pct of IACS |
| Resistance to combustion gases up to 2100°F | No apparent attack in 48 hr |

In this discussion, no attempt has been made to elaborate on specific likely ranges of composition, or service temperature, or porosity, or strength, or corrosion resistance, for any of the experimental materials noted. Much data is being accumulated, but little of it will have significance (except to the researcher and investigator) until specific compositions and their processing techniques appear beyond the realm of research and pilot testing. The writer has tried herein only to show the direction of the most encouraging trends of development toward high-temperature materials with superior service characteristics.

It is not the individual research that betrays the future, it is the composite trend of many researches. The author is thoroughly convinced that the blend of powder metallurgical techniques with ceramics and classic fusion practices, in conjunction with cementing and infiltration processes, will become a most important tool in producing structural components exposed to the severe working conditions at high temperatures

*FIG. 5 - Photomicrograph of a molybdenum skeleton body infiltrated with a cobalt-base about 80 pct by volume. 600X*



# Steelmakers Review

*OPENHEARTH COMMITTEE CHAIRMAN - W.C. Kitto, director of raw materials, Pittsburgh Steel Co., Monessen, Pa.*

*BLAST FURNACE COMMITTEE CHAIRMAN - R. A. Lindgren, general superintendent, Wisconsin Steel Works, Chicago.*

OXYGEN, charging techniques, refractories, sulfur removal, beneficiation, sintering, and carbon hearths, subjects close to the heart of the steelmakers, were among the many topics receiving attention at the 31st conference of the National Open Hearth Steel Committee and the Blast Furnace, Coke Oven and Raw Materials Committee, AIME, held in Pittsburgh, Apr. 12, 13 and 14. The first day of the conference was devoted to a plant trip through the Aliquippa Works of Jones & Laughlin Steel Corp., with the remaining two days given over to technical sessions.

Highlighting the nontechnical phase of the conference was the address by Charles E. Wilson, president, General Motors Corp., at the fellowship dinner, Apr. 13. Charging that America's labor unions are the most powerful monopolies in the nation's history, Mr. Wilson asserted that union monopolies and union dictators threaten the economic security of the nation, exercising a power that is not legally theirs. Mr. Wilson was introduced to the some 1200 steelmen in attendance at the dinner by Joseph Carter, president, Pittsburgh Steel Co.

The two participating committees announced that the next conference will be held Apr. 18, 19 and 20, 1949, at the Palmer House, Chicago, under the direction of the new chairman of the openhearth committee, C. R. FonDersmith, steel plant superintendent, American Rolling Mill Co., Middletown, Ohio, and T. L. Josephs, professor of metallurgy, University of Minnesota, Minneapolis, chairman of the blast furnace group. Mr. FonDersmith succeeds W. C. Kitto, director of raw materials, Pittsburgh Steel Co., Monessen, Pa., while Prof. Josephs succeeds R. A. Lindgren, general superintendent, Wisconsin Steel Works, Chicago.

The McKune award, presented annually, was won this year by Leo B. Sullivan, openhearth metallurgist, Republic Steel Corp., Buffalo, for his paper, delivered at the present conference, entitled "Practices Affecting Yields and Surface Quality of Rimmed and Semi-Killed Steels."

Oxygen once again carried the leading role at the technical sessions, although it is interesting to observe that the burst of enthusiasm that greeted the introduction of oxygen in steelmak-

# Production Problems

## ...1200 steelmakers attend 31st AIME conference

## ...Oxygen principal topic at openhearth sessions

## ...Carbon hearth problems receive attention from blast furnace men

ing, some 2 years ago, and which has prevailed since that time, seems to have been restrained somewhat. Some plants have already incorporated the use of oxygen as an aid in combustion and or in decarburizing in their regular melting practice, while others are still concentrating efforts on accumulating data, detailed and precise, to arrive at optimum methods for utilizing oxygen. Various speakers and discussors at the sessions, even those representing companies that have already embraced oxygen as a more or less routine factor in steelmaking, admitted they were still a long way from the complete story and that there were still many questions to be answered.

Several of the interesting papers delivered at the technical sessions are briefly reviewed in the following text.

The experiences of the Steel Co. of Canada in using basic openhearth refractories were reviewed by A. K. Moore, superintendent of openhearths, Steel Co. of Canada, Hamilton, Canada, in his paper entitled "Basic End and Main Roof Construction for Openhearth Furnaces."

He pointed out that in April 1944, after the possibilities of basic brick had been investigated with a 50-ton openhearth, a complete set of basic ends was installed on their 180-ton furnace. This furnace was operated with sprung silica main roofs until February 1945, when the first of a series of suspended basic main roofs was added to the structure. Since that time they have operated the furnace with a basic main roof, except for one suspended silica roof in 1946, which was put in between basic roofs Nos. 2 and 3. Basic roof No. 5 is now in operation with a life of 130 heats.

*One of the more informative papers delivered at the conference concerning oxygen, "Operation of Oxygen-Enriched Openhearth Furnaces," by J. S. Marsh, research engineer, Bethlehem Steel Co., Bethlehem, Pa., was reviewed in The Iron Age, Mar. 25, 1948, p. 87.*

Considering operation with basic ends plus silica main roofs, this combination was found to result in the following tangible savings which pay for the comparatively heavy initial installation cost in a period of 2 to 3 years of operation:

(1) From 5 to 7 pct more production annually through reduced repair time.

(2) A reduction in repair costs (labor and materials) of 3¢ to 5¢ per ingot ton on the end and slag pocket structure.

(3) A reduction in fixed operating costs of approximately 5¢ per ton through increased production.

(4) A reduction in teardown costs at each repair due to removal of less brick, and low cost and easy removal of the granular, friable slag deposit, which also runs over 50 pct Fe and makes a good grade of blast furnace sinter.

A disadvantage to the basic end structure was found to be in the relatively high air infiltration due to the necessary expansion allowance. This undesirable feature has been largely corrected in more recent designs, however.

Considering operation with basic ends plus basic main roofs, the results to date, which includes full campaigns on roof Nos. 1, 2, 3 and 4, and comparing these results with the average of the comparable four silica main roof furnaces are as follows:

(1) A production advantage of 14 pct. This is an average advantage over the 3-year period during which time charging conditions have varied considerably.

(2) An increase in roof cost (labor and materials) of 24¢ per net ton.

(3) An increase in fuel cost of 3.3¢ per ton.

(4) A reduction of front and backwall cost of 3.9¢ per ton.

(5) A reduction in fluxes of 0.6¢ per ton.

(6) A reduction of fixed operating costs of 19.8¢ per ton.

The above sums up to a 14 pct production gain for an additional cost of 3¢ per net ton produced on this furnace for the 3 years of basic main roof operation.

During the 3-year period charging conditions deteriorated steadily, design and hence roof life improved consistently, the spread between the

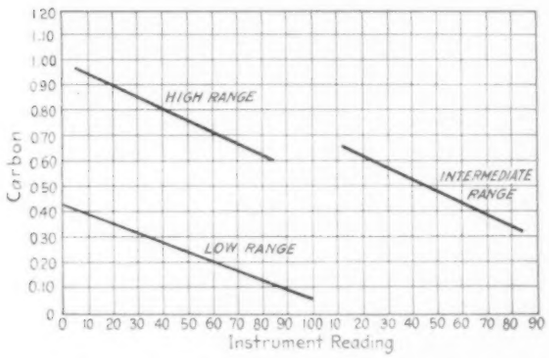



***FIG. 1 - Typical calibration chart, three range instrument.***

cost of silica and basic brick narrowed, and the cost of fuel oil more than doubled in 1947. This has resulted in a reduced production advantage and savings on fixed costs, an increase in the excess fuel cost per ton, and a decrease in the excess roof cost.

The fourth roof campaign indicated that the maximum possible life had not yet been achieved, and it is anticipated that a life of close to 300 heats can be reached in the present (fifth) campaign. If a low repair life of over 500 heats is made, the excess of roof cost, basic to silica, will be narrowed to the point where the rock bottom production advantage of 5 to 7 pct through reduced repair time will more than offset the combined excess cost of fuel and brick and the general adoption of such construction can be fairly well justified for various operating rates, the advantage increasing with increased production rates.

In a paper entitled "An Electronic Carbon Analyzer for Steel Samples," A. C. Chamberlin, research engineer, Bethlehem Steel Corp., Bethlehem, Pa., and E. J. Serfass, professor of analytical chemistry, Lehigh University, Bethlehem, Pa., described the design, construction, operation and properties of a new improved electronically operated carbon analyzer. The instrument measures values proportional to the incremental alternating current permeability of the cast test specimen. By exhaustive tests over a period of 3 years, the instrument is said to have been found reliable in every respect.

The operation of the carbon analyzer is exceedingly simple. No specially trained personnel are required for its operation. A test sample is merely inserted in the test hole and after a few seconds the indication on the meter may be observed. Since the instrument is in continuous operation, there is no warm-up period. Adjustments required are an occasional check of the zero of the instrument before inserting the sample and an occasional check with a standard test sample placed in the specimen holder. Any slight deviations from the standard reading may be corrected by means of a small control knob on the panel.

The indicator on the test panel has been calibrated in a number of instances to read directly in hundredths of a percent of carbon content of the specimen. This direct-reading device greatly facilitates the operation and minimizes errors due to the use of a calibration chart. Also, certain three-range instruments have been installed with the indicators calibrated in arbitrary scale units. Selection of the proper range switch position and appropriate calibration range must be made by the operator from a previous knowledge of the sample. Arbitrary scale readings are then referred to a calibration chart for conversion to carbon content. The chart, fig. 1, shows typical calibrations for a three-range instrument in which carbon content is plotted against instrument reading on an arbitrary scale. The linearity of the calibration curves has been achieved by controlling the design characteristics of the various components.

A new technique for the determination of alumina in silica brick, for use as a basis to predict roof life, was described by H. M. Graul, and E. B. Snyder, chief chemist and refractories engineer, respectively, Wheeling Steel Corp., Steubenville, Ohio, in their paper, "Effect of Alumina on Openhearth Roof Life." The method described, a chemical analysis procedure, has been adapted to routine laboratory analysis and can be performed in approximately 2½ hr.

In this new method sodium thiosulphate is added to precipitate the titanium as titanic acid and the aluminum is precipitated as a phosphate with sodium ammonium phosphate (instead of di-ammonium phosphate). Therefore, the titanium will be present in the ignited residue as titania and the aluminum as $AlPO_4$. The procedure cannot be applied to materials containing large amounts of interferring impurities such as zirconia. The zirconia in a silica brick is not usually over 0.02 pct, and because it would be precipitated as $ZrP_2O_7$ in the final precipitate, a plus error of less than 0.02 pct can be expected.

The authors reported that split roofs were installed in the openhearth using brick with varying alumina contents as soon as reliable analyses were available. These roofs were installed so that the center line of the furnace, front to back, was the dividing line of the brick containing two different alumina contents. The split roof tests proved that an increase of as little as 0.2 to 0.3 pct alumina in a silica brick can be detected in service trials. All of the brick which contained more than 1 pct alumina showed rapid wear, and in trials with silica brick with more than 1.2 pct alumina, premature failures could be expected.

# Radioactive Tracers in Steelmaking

RADIOACTIVE sulfur, traceable and measurable with electronic counters, has been used in a program instituted for the elimination of undesirable sulfur from steel to prove that low pyritic and low organic coals are equally good for the production of steelmaking coke. The experiments are being sponsored by the Republic Steel Corp. and conducted by Arthur D. Little, Inc., Cambridge, Mass., in Republic's Cleveland plant.

Since sulfur can enter steel with the coke derived from coal, or with ore, scrap, limestone or fuel oil, tracer methods of determining the source are particularly applicable.

Statistical correlations of sulfur contents in the raw materials with that of the steel ingots had suggested coal as the major contributor, but steel metallurgists were still not certain which of the chemical forms of sulfur in the coal got through the coking process and entered the blast furnace.

Two important forms of sulfur, pyritic and organic, are found in coal, but the forms change in the coke oven so that there is no chemical means for ascertaining whether the surviving sulfur in the coke stems from the pyritic or organic sulfur. Without this knowledge it was questionable whether low-pyritic or low-organic coal made the better raw material.

For this experiment a small amount of artificial pyrites were prepared using radioactive sulfur and were thoroughly mixed in with 12 tons of coal, the normal charge to the coke oven. The proportion of sulfur in the coke which had come from the pyrites was found by measuring the radioactivity of the sulfur. This measurement indicated that the proportion was about the same as in the original coal and that, therefore, both forms were carried over to the coke equally with no advantage to be gained by using coal with either a low pyritic or low organic sulfur content.

Additional experiments are under way to trace sulfur, in other materials and chemical combinations, through steelmaking procedures.

Radioactive sulfur for this study was obtained from the Atomic Energy Commission at a cost of $50. Prior to the war the cost of the material would have been so excessive that the experiments would not have been economically feasible.

This application is said to be the largest scale industrial use of tracers ever attempted. Other industrial applications have been for determinations of the concentrations of toxic fumes, measurement of the lubricant applied to textile fibers, determination of the amount of metal transferred when a shaft rotates in a bearing, and in many biological and medical applications.

The possibility of using tracer elements to actually control industrial processes is being considered. Radioactive phosphorous added to a bessemer furnace, for example, could show when the last impurity, which is usually phosphorous, had been smelted from the steel. In this application automatic controls actuated by Geiger counters or other radioactivity measuring instruments would turn down and shut off the bessemer when the radioactivity of the melt reflected the target phosphorous concentration.

Unfortunately not all elements have radioactive forms suitable for tracer research. Oxygen, for instance, loses half its induced radioactivity every 2 min, and other elements are not available from pile operations so that costs of the materials are still prohibitive.

The Atomic Energy Commission has established regulations governing the distribution and use of radioactive materials. Professional qualifications, intended use, equipment available for safe handling of the materials and other factors are weighed in order to protect both the experimenters and public from misuse.

Requests for information and applications for radioactive materials should be addressed to Dr. Paul C. Aebersold, Chief of the Isotopes Div., U. S. Atomic Energy Commission, Oak Ridge, Tenn.

## . . . NEW BOOKS . . .

"*Society of the Plastics Industry Handbook.*" Engineering practices and information in regard to plastics have been collated in this volume with contributions from more than 300 authorities in the field. Molding, cementing and assembling, testing, machining, finishing, designing, materials and applications and other information and data on plastics are included. Society of the Plastics Industry, Inc., 295 Madison Ave., New York 17. 451 p. Members, $4.50. Nonmembers, $7.50.

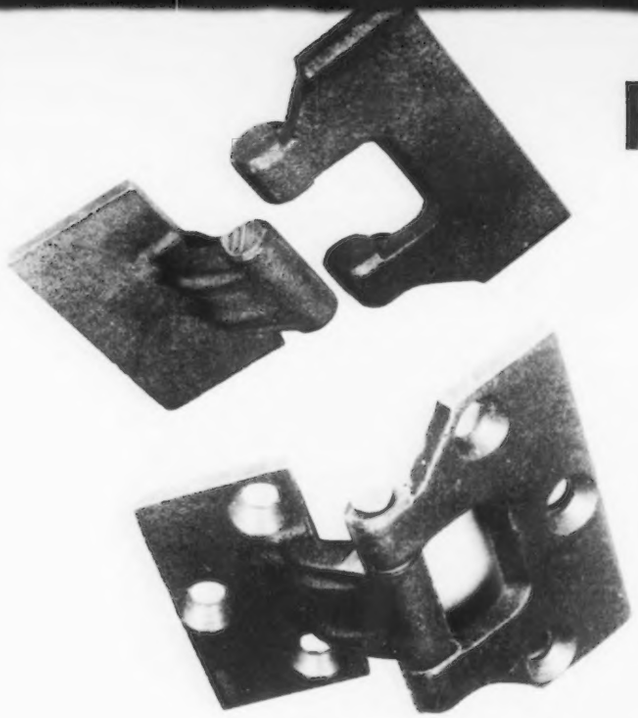
* * *

"*Starting a Small Machine Shop,*" by Fred H. Colvin. Handbook is designed to assist a machinist in opening and operating his own small shop. Selection of machines for well rounded operations, equipment layout and business and management principles are discussed. McGraw-Hill Book Co., 330 W. 42nd St., New York 18. 212 p. $2.50.

"*Running a Machine Shop,*" by Fred H. Colvin and Frank A. Stanley. Book offers pointers for more efficient and profitable machine shop operation to owners, managers and shop foremen. How to equip a shop, how to route and handle work, how to estimate and suggested inspection techniques are among the topics covered. McGraw-Hill Book Co., 330 W. 42nd St., New York 18. 521 p. $4.25.

* * *

"*Handbook for Horizontal Boring, Drilling and Milling Machines and Their Application.*" An analysis of machine fundamentals, basic operations and work methods for horizontal boring, drilling and milling machines is given in this handbook. Boring feeds and speeds are covered in detail and types of tools, bar support and alignment, and boring cuts are discussed. Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. 266 p. $5.



# Rapid Processing of


By JOHN A. BRODEN

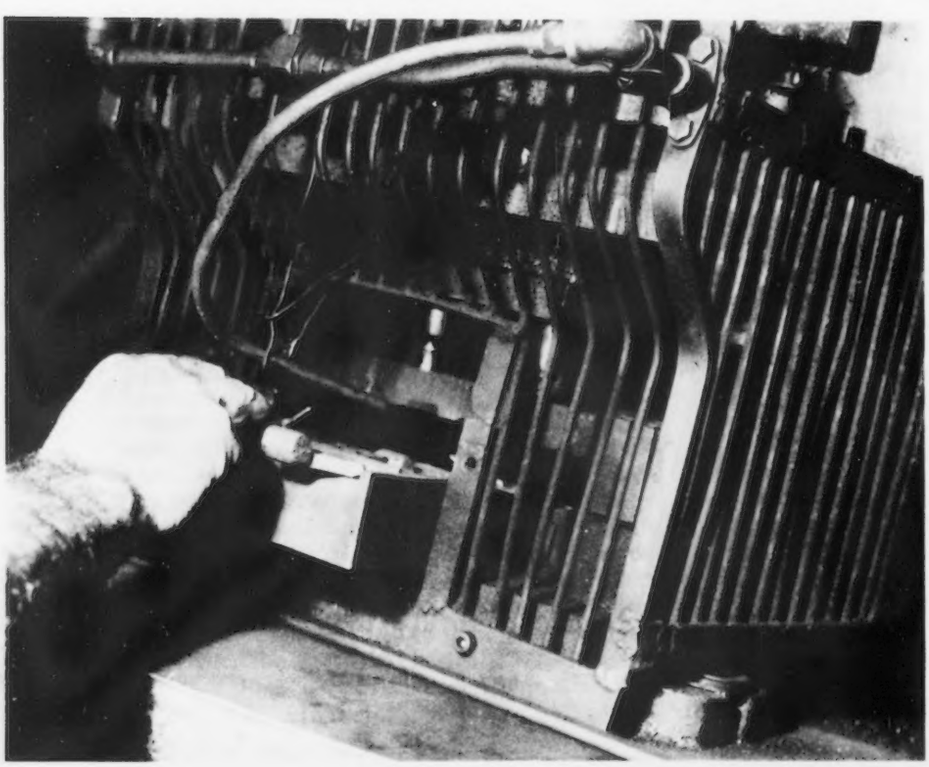
*Plant Superintendent,*
*Fisher Body-Ternstedt Division,*
*General Motors Corp., Columbus, Ohio*



***High speed production methods for automobile door hinges, involving punching, drilling, broaching, and countersinking, as well as assembly, are described. Also, the handling of parts and materials between the various work stations is an interesting phase of the production technique.***


BLANKS for automobile door hinges are pierced, broached, drilled, countersunk and assembled in high speed machine setups at the Fisher Body-Ternstedt Div. of General Motors Corp., at Columbus, Ohio. The two mating blanks are malleable iron casting, and are received in rough form. The rough blank and the finished hinge are shown in fig. 1. Loaded into a bin with a sloping bottom, the castings slide toward the press operator who performs the first operation. This operation is to pierce the three screw holes simultaneously into each piece. This piercing operation is an automatic setup, where the operator loads the castings on a short inclined chute, shown in fig. 2.

Each casting drops onto the inclined die face



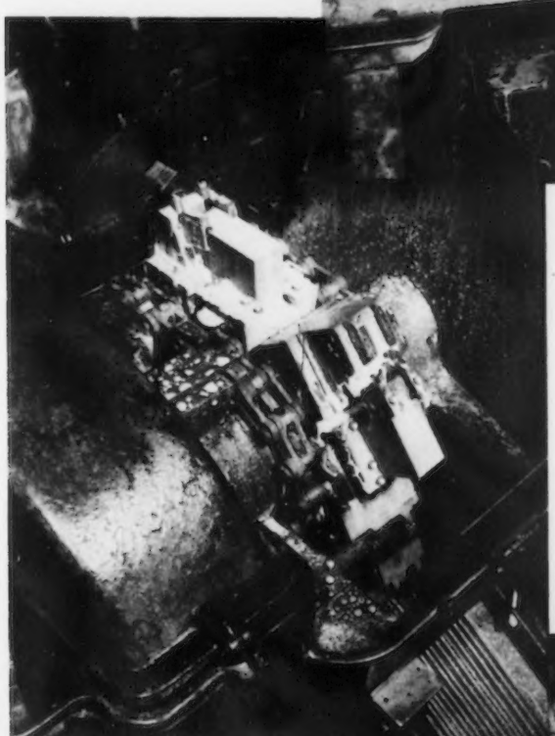
*ABOVE*

*FIG. 1 - The malleable casting as it is received for processing and a finished automobile door hinge.*

*FIG. 2 - Malleable iron hinge castings are loaded into a chute along which they are pushed until they drop against locating pins on the inclined die face. A foot trip actuates the punches that pierce three screw holes.*

# Automobile Door Hinges

*FIG. 3 - Pierced castings taken from bin at left are loaded into the continuously moving fixtures which advance them through a broaching machine not shown.*



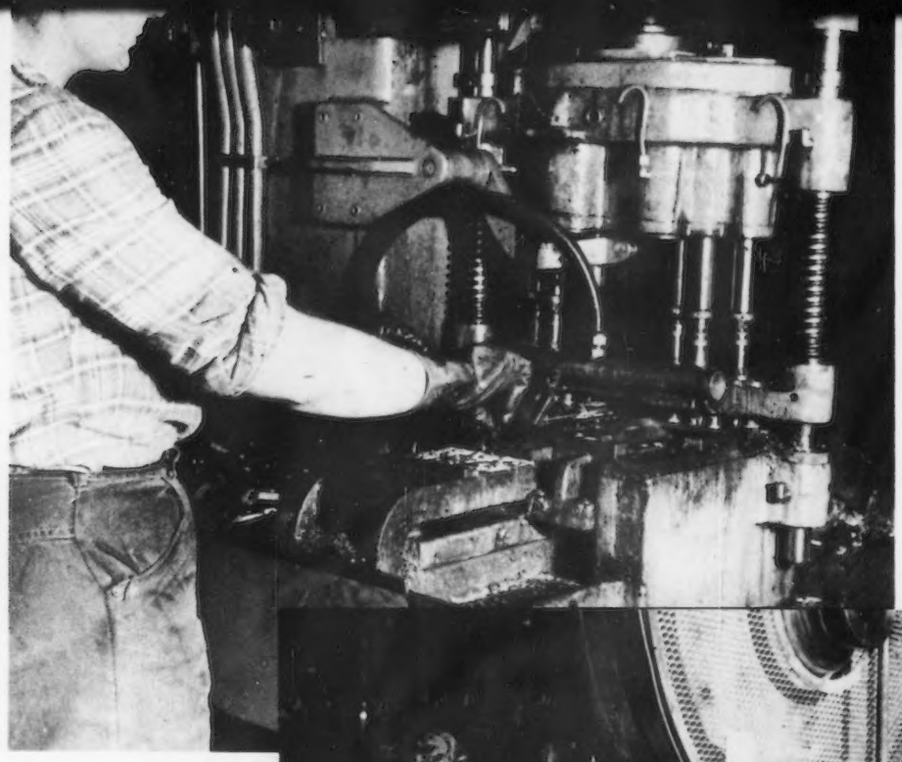
and comes to rest against a stop. This positions it on the inclined face of the die, and the foot trip of the punch is pressed. As the three punches are stripped on the up-stroke, the stop retracts automatically and the casting slides down a chute onto an elevating belt conveyor which delivers it to a large hopper bin for the next operation. As the operator's work is to load the castings and trip the press, the pieces are put through almost as fast as they can be loaded. In all subsequent machining operations, location of the castings is from the screw holes punched in the first operation, as this is convenient and insures correct positioning of the hinge pin in reference to screw holes when

*ABOVE*

*FIG. 4 - After fixtures, advanced by chains, emerge from the broach, they unlock automatically and, as the fixture inverts to proceed back under the bed, castings fall out onto a grid-like chute, lower right.*

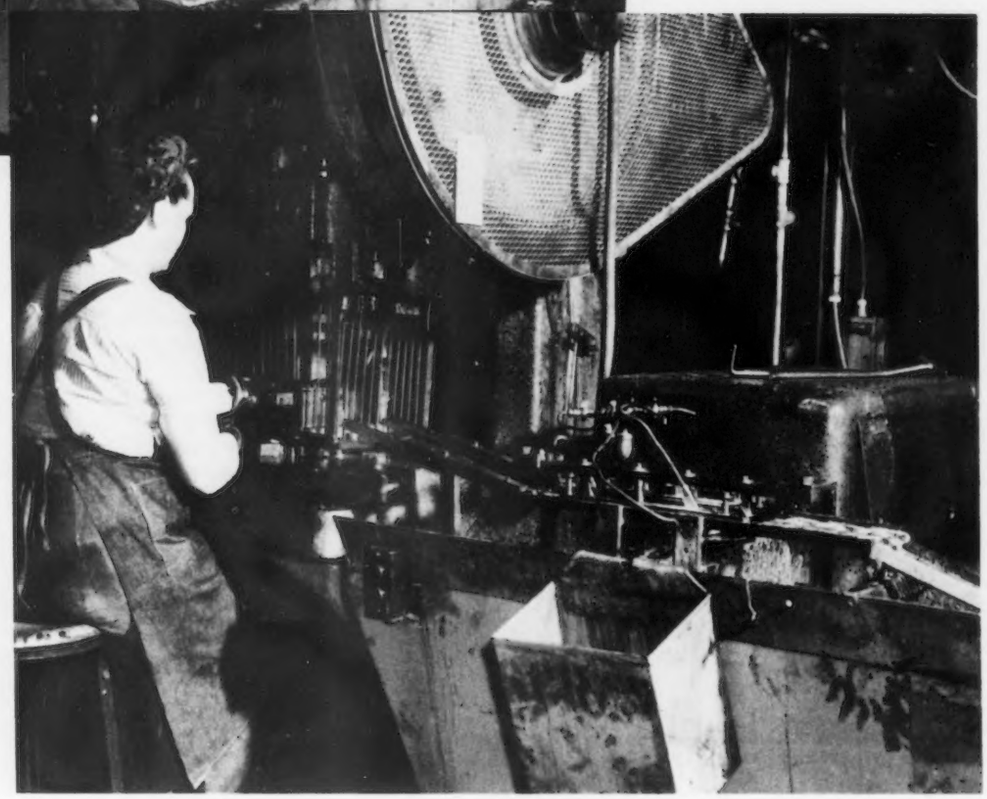
*RIGHT*

*FIG. 5 - Pin holes are drilled in this two-position machine. After the fixture is loaded, the operator presses a button to lock the fixture and drills feed in hydraulically. As drilling proceeds at one station, the other is unloaded and reloaded.*



*LEFT*

*FIG. 6 - The dual fixture for six-spindle drill press moves automatically from loading to countersinking position and then withdraws as countersinks make the cut. Tool feed decreases automatically as countersinks feed to depth.*



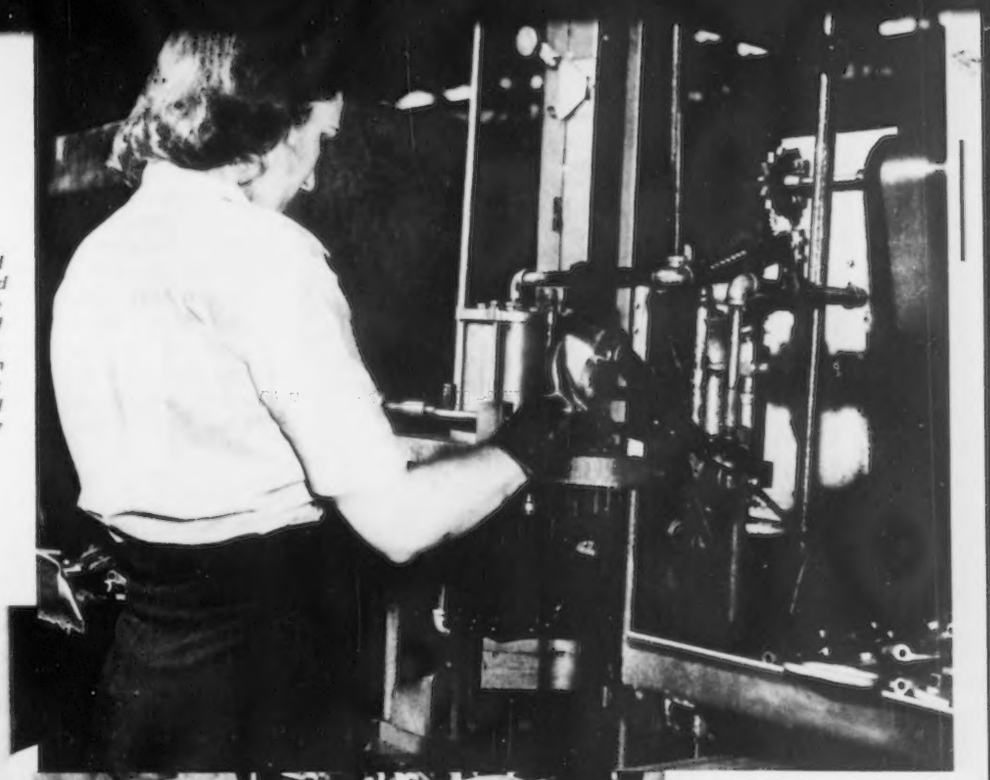
*RIGHT*

*. 7 - To finish broach pin bosses for burr ioval, the punch press right is used. Then tings feed along ways a reciprocating slide a second machine where eamer feeds horizonly into the pin holes give them their final e.*

the hinges are finally applied to doors at body assembly plants. Pierced castings slide down the bottom of the bin into which they are discharged to a broach operator, who loads the castings into a broaching machine. This machine, shown in fig. 3, has 20 fixtures that are advanced continuously by a pair of chains. The operator places a casting in each fixture as it passes the loading station. The fixtures lock automatically and advance along the bed of the machine under the fixed broach which faces the inner and outer ends of bosses. After broaching, the fixtures continue in the chain drive to the end of the bed, fig. 4; unlock automatically; and discharge the castings as the fixtures are inverted on their circuit back under the bed toward the loading station. Parts discharge onto a chute and fall on an elevating belt conveyor which carries them up to a hopper bin mounted on wheels for transfer to the next operation, drilling the hinge pin hole.

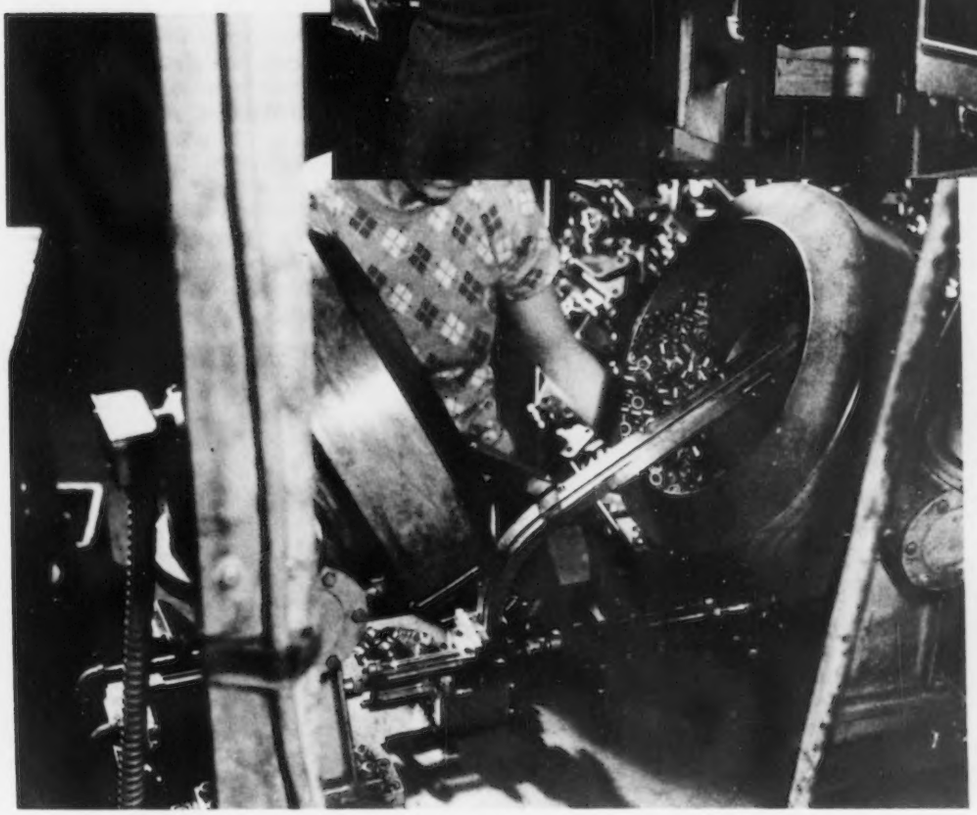
This drilling operation is performed on hydraulic head machines, one of which is shown in fig. 5. Each of these has two stations, used alternately, and are unloaded and reloaded by hand while drilling proceeds automatically at the other station. There are two drills, one coming in to each end of the work at each station.

After loading, the operator presses a button, and clamping and drilling proceed automatically. Both locking and feeding are done hydraulically, the fixture unlocking the piece after drilling is completed. When removed, the part is dropped onto a belt by the operator and is again deposited in a hopper bin on wheels. These bins have chutes from which the castings are removed at convenient height at the next machine.



RIGHT

*FIG. 9 - An air-operated press assembles and clamps the two hinge halves while a pin, fed down through a magazine, is inserted. Chutes from bins at left and right keep operator supplied with castings within easy reach.*



LEFT

*FIG. 8 - Flanged bushing feed automatically fro rotating hoppers dow magazines to position where they are force into the hinge castin as it is held on a fix ture by air-operated rams*

Countersinking of the three punched screw holes, though really a simple operation, formerly caused considerable tool breakage. This breakage has been overcome by a setup in which the countersink feed speed is decreased gradually and automatically as the depth and diameter of the cut increases. The work is done in the setup in fig. 6, on a special drill equipped with a six-spindle head.

There are two sliding fixtures for positioning two parts under the drill head, one for feeding each side. One is loaded by hand while countersinking proceeds on the prior pair of pieces. As soon as one pair of castings is in countersinking position, the countersinks are lowered. Tapered pilot pins enter the pierced holes to insure correct location of the castings. As soon as countersinking starts, the sliding fixtures are withdrawn, leaving the pieces under the tool in correct location. New pieces, then put into the fixtures, are ready to be advanced as soon as the prior ones are completed. When the countersinks have cut to depth, they automatically withdraw and the pieces automatically eject into a chute and thence onto an elevating belt. Then, the operator advances the fixtures with the next pair of castings, starting the next cycle.

The final machining consists of finish broaching the inside ends of pin bosses in a punch press to remove drill burrs and finish reaming of the pin holes. Both machines for this operation are shown in fig. 7. A fixed broach is applied to a holder attached to the bed of the punch press and the piece is laid on the slide of a fixture which moves the casting into broaching position. As the press is tripped, a flat punch on the ram pushes the casting over the broach, removing the burrs formed on

the inside of the bosses by drilling. Then the casting is withdrawn and laid in a track chute to feed the reamer while a new piece is loaded into the fixture.

For reaming, a horizontal spindle is used. Castings feed by gravity down an inclined track to a horizontal track above which there is a reciprocating slide having spring fingers that engage and advance the castings successively into reaming position. A spring frame above the positioned casting presses it against the track and a retracting stop positions it momentarily as the reamer sizes the hole. The reamer is advanced and withdrawn axially as it is rotated, and is synchronized with the reciprocating slide. After reaming, the casting continues along the track and slides down a chute onto an elevating belt conveyor.

Reaming leaves the castings ready for assembly, but flanged porous bronze bushings are applied to mating halves in the special machine, fig. 8. The bushings are fed from rotating hoppers into magazine tracks from which the bushings fall automatically, one at a time, in front of each of two air-operated plungers. The operator places a casting in the fixture which brings the pin holes into line with the plungers and bushings. A pedal operates an air valve and bushings are pressed home by the rams. As the rams are withdrawn, the operator removes the casting and drops it into a chute.

Before the final assembly of the two halves of the hinge, it is necessary to size the bushing holes, as well as the ends of the boss. This is done with the bushed casting held in a die or fixture that brings the pin hole under a sizing punch that is forced through by a press. The parts are then shifted to the assembly press, fig. 9. There, an air-operated ram clamps the two halves of the hinge together and a second air-operated ram presses a pin into place. Pins are fed down a magazine arranged to drop the pins, one at a time, into a holder in front of the ram.

The pin is pressed into the two halves of the hinge when the handle in the operator's right hand is moved downward to operate the air valve. After the hinges are assembled, the assemblies are lifted out by hand and laid on a belt which carries the hinge through inspection to a packing bench.

While these descriptions apply primarily to that half of the hinge in which the pins make a press fit, the mating half, which takes the bushings applied as in fig. 8, is finished in substantially duplicate setups but with tools altered to fit the bosses and bushing holes.

---

## Green Core Handling Simplified by Special Rack and Truck

TRANSPORTATION of large batches of green cores from the coremaker to bake ovens has been simplified by the use of a specially built, shelved rack at the Chemung Foundry Co., Elmira, N. Y.

A spring frame hand truck which absorbs jolts due to uneven foundry floors and thereby minimizes the danger of damage to the cores is used to transport the rack.

Construction of the unit and the special truck are shown in the accompanying illustration, used through the courtesy of Yale & Towne Mfg. Co. The rack is especially useful in handling small, oddly shaped pieces as the design provides for adjustable shelves.

Ledges for supporting the shelves are made from 2 x 2 in. angle iron, welded flange to flange to form channels. The welded construction was used rather than ready made channels in order to facilitate machining operations prior to assembly. In construction, holes were first drilled in the flange of one angle surface to allow bolting to the rack frame, notches to secure the pipes which support shelves were cut in a flange of the other angle, and the pieces were then welded to form the desired channel.

The shelves are comprised simply of steel plates supported by pipes and have the advantage of allowing easy loading of the plates onto the rack frame. The pipes can rotate slightly under the plates during loading and unloading, but will not rotate in their notches during transit because of the weight of the load.

Adjustment of the shelves for handling different sized cores is accomplished by bolting the channel ledges to holes in the rack frame in whatever spacing arrangement is required. Several different shelf heights are shown in the illustration.

*Racks for transporting green cores provide adjustable shelves to accomodate batches of odd sized pieces. The truck has a special spring frame for shock absorption.*

# Melting Iron in Gas-Fired Crucibles

USE of gas-fired crucibles for melting alloy irons permits unusually close control of composition, according to a Worcester, Mass., foundry that utilizes this method for producing irons with the sulfur running as low as 0.04 pct. This metal is used in producing wrenches, gears and other machine parts. The gas fuel, according to the foundry engineers, is especially helpful in minimizing sulfur pickup.

***The practice employed by a Worcester foundry in the use of gas-fired crucibles for melting low sulfur alloy iron is described in this article. The construction of the furnaces, particularly with respect to types of refractories used, and the fuel consumption are covered in detail.***

The furnace equipment of this foundry consists of six No. 200 tilting type gas-fired crucible furnaces, several of which are shown in fig. 1, each rated at 500 lb. Five of these furnaces are identical in construction, having a side wall lining of 2-in. silicon carbide preburned lining, backed up with a 4½-in. rammed lining. The bottom of the furnace is 4-in. fire brick tile. The cover, which is removable, consist of 4-in. thick silicon carbide tile, with an 8-in. hole in the center for a flue. The inside dimensions of these five furnaces are 22 in. diam by 28¼ in. high. The gas input is 3500 cu ft of 530 Btu gas per hr.

The sixth furnace is of a similar type with inside dimensions of 26 in. diam by 28¼ in. high and has a gas input of 4000 cu ft per hr. The wall of this sixth furnace consists of 2-in. preburned silicon carbide lining backed up with 9-in. rammed lining. The bottom of the furnace is made of 2½ in. of mulite plus 4½ in. fire brick backed up with 2 in. of rammed insulation. The removable cover is 4-in. silicon carbide with a 9-in. center hole for a flue. It will be noted that this latter furnace is 4 in. greater in diameter and consequently has a larger capacity.

The silicon carbide covers seem to give the longest life, but the greatest heat loss. Other ma-

TABLE I

No. 6 Furnace
Heat Run on No. 400 Special Crucible

| Heats | Time Started | Time Poured | Time Melt | Temp, °F | Weight Metal Poured, lb | Cu ft Gas Used | Cu ft Gas Per lb |
|---|---|---|---|---|---|---|---|
| 1st | 5:30 a.m. | 9:30 a.m. | 4 hr | 2720 | 775 | 16000 | 20.6 |
| 2nd | 9:40 a.m. | 12:30 p.m. | 2 hr-50 min | 2740 | 775 | 11333 | 14.6 |
| 3rd | 12:40 p.m. | 3:30 p.m. | 2 hr-50 min | 2750 | 775 | 11333 | 14.6 |
| 4th | 3:40 p.m. | 6:30 p.m. | 2 hr-50 min | 2750 | 775 | 11333 | 14.7 |

Output: Iron — 3100 lb x 555 Btu per lb of iron at pouring temperature = 1,720,500 Btu.
Input: Gas — 49,999 cu ft x 530 Btu per cu ft = 26,500,000 Btu gas consumed.
Melting Cost per lb Iron — 16.12 average cu ft per lb x 50¢ per M = 0.8¢ per lb melted.

No. 6 Furnace
Heat Run on No. 200 Crucible

| Heats | Time Started | Time Poured | Time Melt | Temp. °F | Weight Metal Poured lb | Cu ft Gas Used | Cu ft Gas Per lb |
|---|---|---|---|---|---|---|---|
| 1st | 5:30 a.m. | 9:30 a.m. | 4 hr | 2720 | 500 | 14000 | 28 |
| 2nd | 9:40 a.m. | 12:30 p.m. | 2 hr-50 min | 2740 | 500 | 9916 | 19.8 |
| 3rd | 12:40 p.m. | 3:30 p.m. | 2 hr-50 min | 2740 | 500 | 9916 | 19.8 |
| 4th | 3:40 p.m. | 6:30 p.m. | 2 hr-50 min | 2750 | 500 | 9916 | 19.8 |

Output: Iron — 2000 lb x 555 Btu per lb of iron at pouring temperature = 1,110,000 Btu per ton of iron.
Input: Gas — 43,478 cu ft x 530 Btu per cu ft = 23,186,440 Btu gas consumed.
Melting Cost per lb Iron — 21.85 average cu ft per lb x 50¢ per M = 1.1¢ per lb melted.

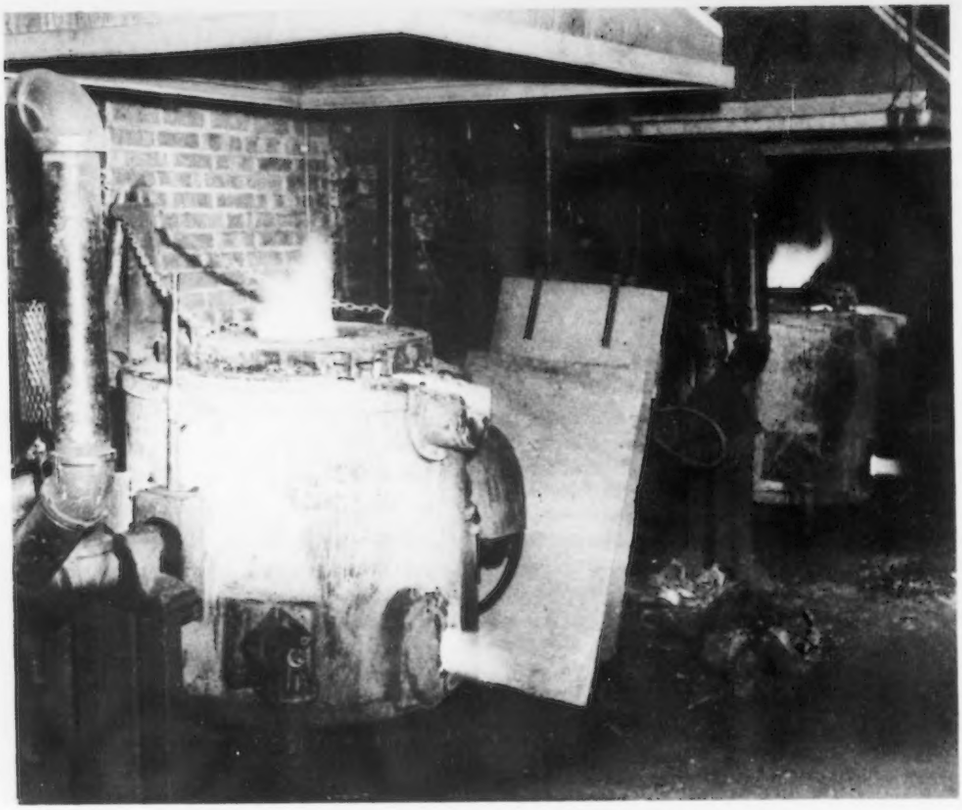


*FIG. 1 - Gas-fired crucible of 500-lb capacity. Two burners are used, having a total input of 3500 cu ft of 530 Btu gas per hr.*

terials with lower conductivity factors have been tried with their lower heat loss, but have been found to spall with a resultant reduction in useful life. When the furnaces were first installed, an attempt was made to have the flue passages at the top free of unmelted metal so as not to disturb the internal pressure of the furnace, thus changing the air-gas ratio. This was found to have no advantage in melting and actually increased the time for the total melt. The practice now is to pile as much cold metal on top of the cover as can be accommodated. In this way the metal is preheated and is then pushed into the crucible as fast as the melting takes place.

In the larger furnace using the No. 400 crucible, the original internal lining consisted of 2-in. silicon carbide preburned lining made up of curved sections to form the contour of the inside of the furnace. This was backed up with 4½ in. of K30 insulating brick followed with 4½ in. of K23 insulating brick. This lining gave about 30 heats, and when examined showed fusion in different spots where there was apparent leakage from the combustion chamber through cracks in the silicon carbide inner liner. This eventually led to the spotty destruction of furnace wall back to the casing. In order to increase the lining life, a sacrifice of furnace lining radiation had to be made. This was done by substituting a rammed lining between the outer shell and the silicon carbide inner liner. Now more than 100 heats from the lining can be expected. The sketch, fig. 2, shows the probable heat loss, outside face temperatures and the space available for combustion.

Crucible life on all these furnaces has been about 5 heats, but occasionally as many as 15 heats have been obtained from a single crucible. A new type of crucible with a more rounded shape at the bottom is now being tried with the hope of improving the life of the crucible.

The temperatures of the combustion chambers in these furnaces have been observed by an optical pyrometer as high as 3100°F and, as might be expected, a great deal of trouble was experienced from burner deterioration. The five smaller furnaces have two burners per furnace fired tangentially, and located 3 in. above the bottom of the combustion zone. The burners are made of cast iron and the original ones extended to within 3 in. of the inside of the furnace. Being so close to such a high temperature, they soon burned off and repairs had to be made. The tunnels were rammed with alundum cement and very little trouble has been experienced since using this material. On the larger furnace there is only one burner located 6 in. above the bottom of the combustion zone and gives excellent results with practically no burner trouble. Gas is supplied to the furnace burners through zero governors and low pressure inspirators, with air supplied at 20-oz pressure.

Data on actual runs are given in table I, one set of melts using a No. 200 crucible and one set a No. 400 crucible, the latter crucible being used in the newest and larger No. 6 melting furnace. These data were made available by the industrial division of Worcester Gas Light Co. Cognizance should be given the practical interpretation of the data submitted. It is quite evident that the larger

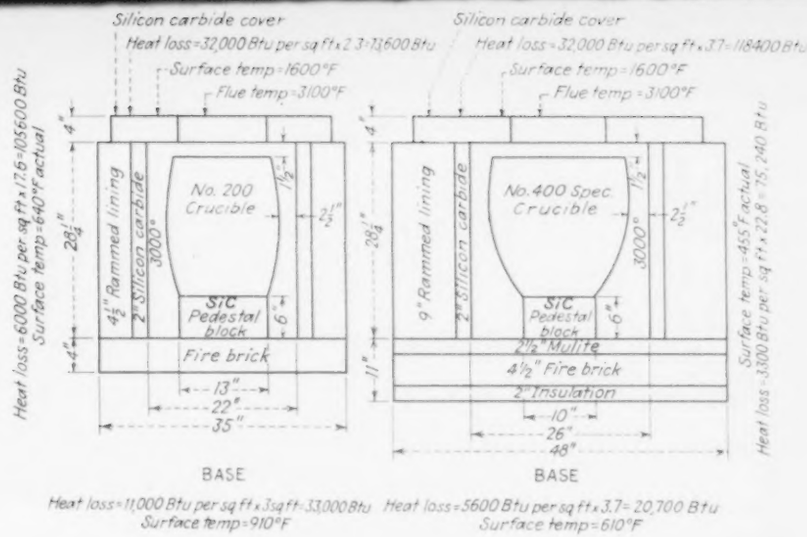



***FIG. 2 - Sketch shows dimensions of furnaces, type of refractories used and calculated heat losses at various points.***

furnace with an internal diameter of 26 in. is too large for a No. 200 crucible when economy of operation is considered. This can be explained that when using a No. 400 crucible in the furnace, more combustion space was available due to the shape of the lower part of the larger crucible, and more effective radiation from the wall was obtained as the crucible was closer to the wall of the furnace and more area was exposed to the wall radiation.

# Gage Length Marker for Tensile Test Specimens

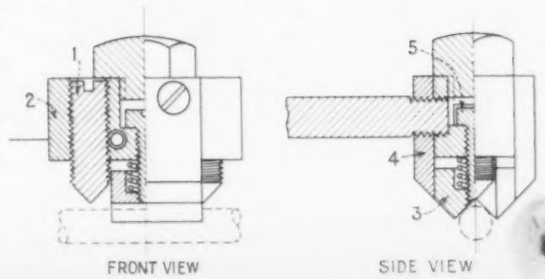
INCREASED accuracy and speed in the routine marking of gage lengths on tensile test specimens is said to have resulted from the use of a specially built marker developed by E. St. John Tytherleigh, De Haviland Aircraft Co., Ltd., Middlesex, England. Tools of this design can be made for gage lengths down to 0.7 in.

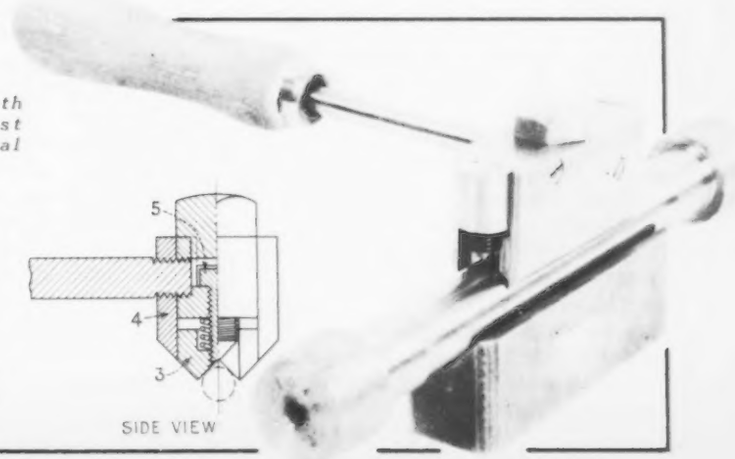
The marker, shown in figs. 1 and 2, consists of a pair of punches (marked 1 in fig. 2), hardened and ground to a fine 90° point and set in a block (2) the required distance apart. These punches are threaded to facilitate removal and adjustment if and when regrinding is required. The marker is located on the test piece by a spring loaded V block (3) which is guided by the punches and the side plates (4). This V block can be adjusted by means of a screw (5) inside the body so that when the unit is placed on the tensile test piece the points are just clear of the parallel.

For routine quantity specimen marking it is preferable for the test piece to be placed in a V block, as in fig. 1, although this is absolutely essential only in the case of soft materials which might distort somewhat under the hammer blow. The gage length marker is held in position on the sample and a light hammer blow on the striker head, the force of which will vary with the hardness of the sample, marks the specimen.

Ordinary markers consisting simply of two punches set in a block have no means of assuring that the points are located on the top dead center of the tensile test piece parallel, and the points tend to slip off when the actual marks are being made so that accurate axial marking is uncertain. Marking with dividers may also be comparatively unsatisfactory as, except with very soft metals, the marks made are light and are occasionally difficult to locate after failure of the test sample.

*The gage length market is shown here both in cross section and with a tensile test specimen in position. In the cross sectional views, 1 is a pair of punches, 2 is the mounting block, 3 is the spring loaded V block for positioning, 4 is a side plate, and 5 is the screw adjustment for the V block.*



*Upper left shows the finished wraparounds for the Kodak Duaflex camera. This forming follows the grooving operation performed on the edges of the wraparounds. Lower left shows the parts before forming on the tangent bender. Aluminum strip is grooved in a Yoder mill, cut to length, punched and embossed as shown, and the parts are then bent to shape. Upper right shows back wraparounds being produced on the bender. The upright head of the turret is about to form the part; while the head to the right has just ejected a part by means of the cam operated fingers; and the head at left is idle.*

# Tangent Bender Forms Camera Body Parts

AN unusual application of tangent benders, probably the first use of such a machine in the manufacture of camera housings, is in the production of the Eastman Kodak Co.'s new fixed-focus, twin-lens reflex camera, the Kodak Duaflex. The new camera measures 4½ x 3⅜ x 3-3/16 in. The body of the camera is constructed of light aluminum alloy and plastic, finished with a black levant-grain finish with a front plate of anodized aluminum.

In forming the front and back plates, or wraparounds, of the camera, two tangent benders built by Struthers-Wells, Titusville, Pa., are used. These machines, as adapted by Kodak engineers, perform operations that are almost unpractical by ordinary punch press methods.

Both front and back wrap-arounds of the camera are formed from special aluminum coil stock 0.030 in. thick, held to a tolerance of ±0.002 in. These are bent to form the top and bottom of the camera body and are channeled to hold the plastic side panels firmly in place, as shown in fig. 1.

Precut 10-ft lengths of this stock are channeled on a Yoder channeler. Prior to bending but after channeling, embossing and punching is done. In forming the front wrap-around shown in fig. 2, the viewing lens hole (indicated by 1 in fig. 2) is embossed and the taking lens hole (2, fig. 2) is perforated at the first station. Punches at the second station perforate the viewing lens hole and the hole for the brilliant finder (3) as well as three holes for the hinge (4). Four holes for the latch (5) and four others for the name plate (6) are perforated at station three.

Here the plate is cut to length and automatically transported by vacuum cups to the three-place tangent turret where it is bent to shape on male and female dies and ejected. No wrinkle is left and no take out required.

The tangent bender performs only the shaping of the embossed and punched strip, as shown in fig. 1. The flat stock is fed into the bender over one of the three turrets as shown in fig. 3. The turrent, mounted on a vertically sliding ram, moves upward into a mating die, forcing the strip over the turret head. The ram then drops, the turret indexes, and the four fingers shown in the lower right turret head in fig. 3 advance and eject the part onto the chute. The third station is idle except for the fact that the ejecting fingers are withdrawn preparatory to receiving the next strip as the turret indexes again. At each indexing another part is formed, and production is at the rate of 12 parts per min.

Similar steps are followed in forming the back wrap-around where the clearance for the tripod screw (8) and the film window (7) are embossed at the first station. At station two the film window is perforated, together with four holes at the latch end (9) and three holes (10) for the hinge. Station three is an idle station.

Close tolerances are held throughout on both the front and back plates. A tolerance of ±0.005 in. is allowed on the overall length of the piece with perforations held to 0.001 in. diam and the center distance held to a similar figure.

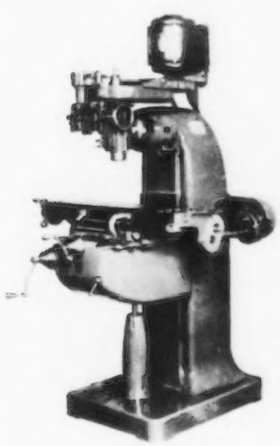
In assembling the camera the taking lens and brilliant finder are added to the wrap-around as a subassembly. This is combined with the side panels and the interior subassemblies before the front molding, viewing lens, and nameplate are added to the camera. The back wraparound, stabilized with a filler of aluminum covered with Kodadur, makes up a second subassembly, one of the last added to the camera.

# New Equipment . . .

A high-speed vertical milling machine, a pull-up hydraulic broaching machine, a threading machine, small press brakes, a tube-cutting and flaring machine, a grinding wheel salvaging machine, an automatic sample changer, an electronic micrometer, a chrome-aluminum enamel, and various small tools and fixtures are described in this week's issue.

### *Vertical Milling Machine*

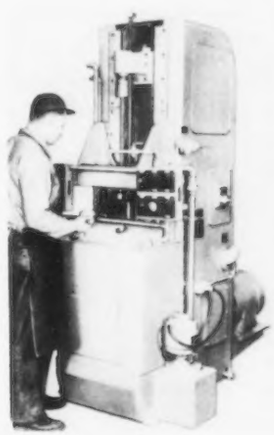
FEATURES of the Model 50 high-speed vertical milling machine introduced by *Index Machine Co.*, Jackson, Mich., include a quick change geared table feed mechanism which delivers power to the table through a splined feed shaft, eliminating the key way of the lead screw. The machine is designed for vertical and horizontal milling as well as boring and drilling. Table size is 8x34 in. with 3 variable table speeds



and 12 cutter speeds up to 2400 rpm. Spindle downfeed and table feed are automatic. A feature is the right angle milling head which handles horizontal milling operations as well as boring and drilling. The unit can also be used as a cutting arbor or tool holder.

### *Internal Broaching Machine*

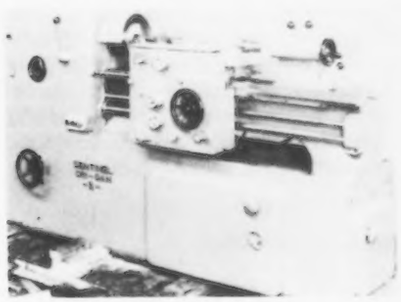
ADDITION of a VP-2-8-24 machine to its line of vertical pull-up hydraulic broaching machines for internal broaching of small parts has been announced by *American Broach & Machine Co.*, Ann Arbor, Mich. The machine is electrically controlled and push-button operated with one full cycle completed on semiautomatic operation. Provision can be made to stop the machine at the end of the broaching stroke for step-cycle operation. Fully automatic operation is possible by building a



hydraulic interlocked loading slide into the machine with a magazine type loading unit. The machine has a normal broaching capacity of 8 tons with a maximum of 10 tons. Stroke is 24 in. with a variable broaching speed of 15 to 24 fpm.

### *Threading Machine*

THE Cri-Dan semi-automatic high speed threading machine, manufactured by Sentinel (Shrewsbury) Ltd., Shrewsbury, England, and distributed by *Lees-Bradner Co.*, Cleveland 11, is a thread cutting lathe modified to traverse the cutting tool through the cut at rates up to 100 strokes per min. Thread size or pitch diameter control is so close that pitch diameters can be held to tolerances of thousandths of an inch. The machine generates threads using a single point cemented carbide tipped tool, a multiplicity of cuts being taken across the workpiece being threaded, the number depending on the job being performed. Rate of infeed is either constant or diminishing, depending on the threading being done. The tool is automatically cleared back out of the cut at the end of each stroke. By use of the Cri-Dan threading principle, single tools are used for both single or multi-start, straight or tapered threads. The machine can be changed over from one job to another in 10 to 15 min by rearranging the gearing. Multi-start threads up to 12 can be pro-



duced, indexing automatically. Taper thread up to 25° included angle can be cut, and the machine handles either internal or external work, right or left hand, the profile of the thread itself depending only on the tool. Acme, square U.S.S., buttress, Whitworth, or any other form, single, or multi-start threads, steering worms, starter worms, or special shapes can be cut.

### *General Purpose Grinder*

A REDESIGNED model of the No. 13 universal and tool grinding machine has been announced by *Brown & Sharpe Mfg. Co.*, Providence 1. This model is recommended for toolroom operations

such as grinding small and medium-sized cylindrical work, form grinding, sharpening milling cutters, reamers and similar tools. It is driven by 3 constant speed motors; 1 hp for the wheel spindle, ¼ hp for the table and 1/6 hp for the headstock. Both plain and antifriction bearing wheel spindle units are available. Three wheel spindle speeds are provided and 5000 surface feet is available for a 7-in. wheel. Table speed rates range from

7¾ to 100 ipm. Two rates of hand table travel are provided, 6¼ and ¼ in. per revolution of handwheel. Headstock provides 4 work speeds, 106 to 525 rpm, for both dead center and revolving spindle drive. Automatic lubrication of table ways and all mechanisms in base is provided by pump from oil reservoir in base.

### Boring Machines

BORING machines designed to disintegrate broken taps, drills, end mills, reamers, screws, studs and similar objects without changing the temper of the metal have been developed by *Electro Arc Mfg. Co.*, 5930 Commonwealth Ave., Detroit. They are described by the manufacturer as being able to cut any size or shape hole in steel or metal including carbides from 0.040 to 1 in. and up in diameter and in round, square, hexagonal, U and bar shapes.

### Press Brake

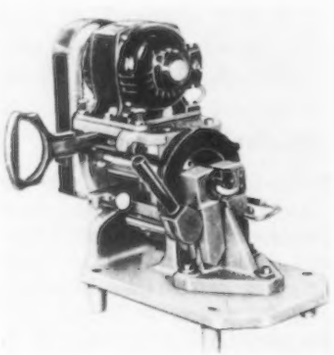
THREE small, all-steel, welded press brakes have been developed by *Knight Machinery Co.*, 1001 S. Delaware St., Indianapolis, to meet the need for smaller, less expensive machines. Features of these brakes include heavy welded construction, conveniently placed switches and control handles, micrometer dials for out of parallel adjustment of ram and infinitely variable speed adjustment. Maximum open height is 7½ in., minimum, 5½ in. Stroke is 1½ in. The speed is 19 to 67 strokes per min. and the press is powered with a ½ hp motor of 1750 rpm. Machines are available in 24, 36, and 48-in. x 18 gage capacities.

### Heavy Duty Relay

A HEAVY duty, rear connected multiple dc magnet operated relay announced by *Westinghouse Electric Corp.*, 306 4th Ave., Pittsburgh 30, is designated the AYB and is available in 4, 6, 8, 10, 12 or 14 pole combinations. This relay is designed for operation on 600 v and below. Contacts are double break, silver to silver; will carry 10 amp continuously and have a maximum interrupting capacity of 150 v-amp. Its salient feature is said to be a fast drop-out of the contacts when the coil is de-energized. The relay is available with contacts that operate all normally open or in combination with some contacts normally open and some normally closed. The relay is recommended for use on machine tools, in steel mills and for other heavy applications requiring interlocking of circuits.

### Cutting-Flaring Machine

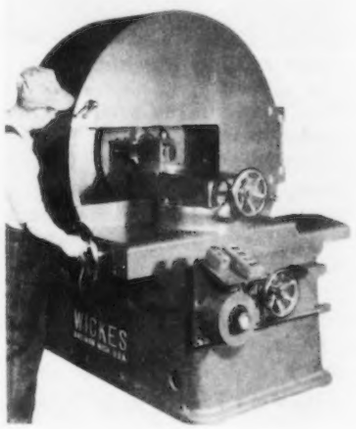
AN ELECTRIC tube-cutting and flaring machine which cuts, flares and trims copper or aluminum tubing in one operation has been announced by *C. J. Unger Mfg. Co.*,



Dayton. The machine is capable of performing more than 5000 flares in 8 hrs. of operation, it is reported. By installing a wedging mandrel in place of the flaring mandrel, standard swedging operations can be performed. Since the tubing does not turn, the machine handles any length of tubing in sizes from ¼ to ¾ in. OD. Leaks caused by crystallization of metal are said to be eliminated.

### Salvaging Machine

GRINDING wheels that have served their useful life on one type of grinding machine can be reworked for subsequent use on another grinding operation, with the

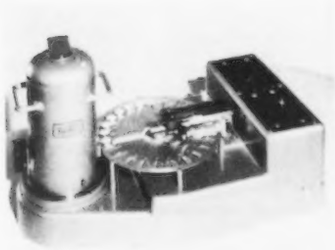



grinding wheel salvaging machine developed by *Wickes Bros.*, Saginaw, Mich. This machine is capable of handling grinding wheels up to 42 in. in diam and 14 in. thickness. The outside diameter can be turned down, the sides can be turned down or the bore enlarged. The machine is also suitable for doing angular work on grinding wheels. Operation of the main spindle over a wide speed range is powered by means of a 5 hp dc main drive motor.

### Automatic Sample Changer

AVAILABILITY of the SC-6 automatic sample changer for laboratories which make routine radioassays on large numbers of samples has been announced by *Tracerlab Inc.*, 55 Oliver St., Boston 10. The instrument is said to permit radioactivity measurements on as many as 25 samples automatically without attention. Results are printed on paper tape. This sample changer is also designed for use in making half life measurements on short half life materials, or, with minor changes, it can be used for obtaining energy spectrum data on a particular sample. Other units used with this instrument include the Autoscaler for detecting

and totalizing radioactive disintegration of the sample; the Tracergraph printing interval timer for recording time required for a predetermined number of disintegrations; lead shielded manual sample changer with preamplifier to lower



background count and permit a reproducible geometrical relationship between the sample and G-M tube mounted in the lead shield.

### Electronic Micrometer

FOR measuring fine wire, metal strip and foil, paint films, and other thin materials, hard or soft, conducting or non-conducting, *Carson Micrometer Corp.*, Little Falls, N. J., has announced the new Model K electronic micrometer. This instrument measures materials as thin as 0.0001 in. with an accuracy of 20 millionths of an inch, under anvil pressures as light as $\frac{1}{4}$ oz.

Operation of the instrument is independent of operator skill or sense of touch. Measuring range of the Model K is $\frac{1}{8}$ in., but micrometer head may be raised to accommodate work up to $\frac{3}{8}$ in. thick. Anvils are of hardened steel and may be of any diameter from 1/64 to 5/16 in., with flat or spherical surfaces. Anvil pressure may be any value from $\frac{1}{4}$ oz to 1 lb. Standard combination is $\frac{1}{8}$-in. flat anvils and 2-oz anvil pressure, with anvils lapped flat and parallel to 10 millionths. The instrument is portable, is unaffected by vibration or temperature changes, and requires no leveling.

### Motor Control Center

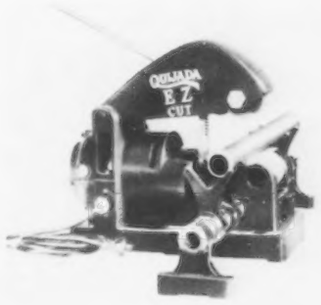
CONTROL of any number of motors rated up to 200 hp at 440v from one central location, is offered by *General Electric Co.*, Schenectady 5, with the motor control center designed to permit all connections being made from the front. The control centers consist of standard starter units slid into cabinets which are 90 in. high, 20 in. wide and 12 in. deep. Starters are available in five sizes. Power connections to starters are made with contacts which grasp vertical busses in the rear of the sections when the starters are slid into place. Control interconnections are made through a wiring trough and wiring is done at the front without disturbing starters. Each starter is equipped with a circuit breaker which is interlocked so that the doors of sections cannot be opened when power is on.

### Speed Reducers

SERIES 7700, 7-in. center distance speed reducers in 10 standard ratios ranging from 5:1 to 70:1 has been added to the line of heavy duty right angle reducers manufactured by the *Cone-Drive Div., Michigan Tool Co.*, Detroit 12. The new series is an intermediate size, available in three types: HU-7700 with pinion under the gear; HO-7700, with pinion over the gear; and HV-7700, with gear shaft vertical. All ratios and types are also available with double extended gear shafts or double extended pinion shafts. Mechanical horsepower ratings range from 1.56 hp at 100 rpm for the 70:1 ratio to 94.2 hp at 2400 rpm of the pinion for the 5:1 ratio. Scientifically proportioned and located fins are cast integrally with the speed reducer housing for low operating temperatures.

### Pipe and Tube Cutter

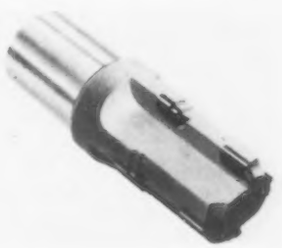
POWER-DRIVEN rollers, automatic stop-start action and ball bearing operation are features of the E-Z Cut pipe and tube cutter now available from *Quijada Tool Co., Inc.*, 5474 Alhambra Ave., Los Angeles 32. Pipe and tube in diameters ranging from $\frac{3}{8}$ to 4 in. may be cut, also cast iron pipe within this range. The machine is portable, with an integrally-mounted $\frac{1}{2}$-hp 110 v. universal type ac-dc motor furnishing direct gear drive to the rollers. Gears are self-lubricating. An automatic trip-switch is




provided to start cutting operations when the cutter wheel contacts the pipe and to stop when the cut is finished. Roller yokes are adjustable.

### Cutting Tools

PRODUCTION of a new line of multioperation carbide - tipped cutting tools capable of performing chamfering of a small bore, facing of a step, reaming of a diameter, chamfering of a diameter, reaming of a counterbore diameter, and chamfering of a counterbore diameter has been announced by *R. F. Cook Mfg. Co.*, 2732 Second St., Cuyahoga Falls 24, Ohio. All of the operations are accomplished simul-



taneously, with one tool, without retooling, without extra inbetween handling, it is claimed. Outstanding feature of this multioperation tool is that it can be resharpened without affecting the length of either the shoulder lengths or the diameters because the teeth are form relieved. All tools can be held to tolerances within 0.0005-in.

### Contact Wheel

CALLED Beltflex, a contact wheel for abrasive belt polishing has been announced by *Di-*

*vine Bros. Co.*, 200 Seward Ave., Utica, N. Y. This wheel has been designed to eliminate the necessity of using buff sections under abrasive belts. The Beltflex wheel is said to have all the advantages of the buff sections plus controlled balance and density, and a smoothly ground surface, which makes for uniform belt tracking. The wheel is available in two degrees of density, Type E offering great flexibility, type G, flexibility with aggressive cutting action. Face widths and diameters for most requirements are available.

### Vibration Mounts

MACHINERY vibration mounts consisting of the CM-H for horizontal and rotary vibration and the CM-V for vertical vibration in top-heavy and recoil type machines have been made available by *Finn & Co.*, 2850 8th Ave., New York 30. The design of the CM mounts involves no rubber-to-metal bonds and they are said to employ the rubber-in-shear principle. Synthetic rubber inserts are held in place by steel retaining brackets. CM-H mounts are designed particularly for use under machinery such as precision grinders, lathes, generators, pumps, compressors, job borers, etc. The CM-V series is recommended for machines where vertical vibration causes recoil and rocking such as may be encountered on punch presses, shears and tank-mounted air compressors.

### Die Inserts

DIE inserts for marking or decorating parts produced by injection molding and die casting are now available from *New Method Steel Stamps, Inc.*, 147 Jos. Campau, Detroit 7. Use of such inserts permits incorporation in die assemblies of part numbers, lettering, numerals, trade marks, etc., on both metal and plastic parts. A pantographic method of engraving is employed to produce the lettering on the dies, making it possible to produce embossed or debossed die inserts accurately.

### Drilling Fixture

THE universal part holder introduced by *Mueller Industries*, 4755 N. Rockwell St., Dept. 45, Chicago 25, is a fixture for drilling, milling, tapping, threading, counterboring, and similar operations, which may be operated manually or automatically. The fixture uses a self-centering principle and is adjustable for location and pressure.

Clamping jaws have a maximum opening of 3/16 in., permitting a part to be held behind a shoulder. The part holder is designed to hold work up to 1 in. round or hexagon, and irregular shaped pieces within that range. Drill sizes up to ½ in. may be used and the unit can accept, interchangeably, standard ASA drill bushings. The height of the bushing from the work is adjustable to allow for adequate chip clearance and coolant entry.

### Face Mill

A NEW series of fly cutters and face mills made to fit the conventional arbors and the standard American spindle nose drives of

milling machines has been announced by *Kendall Corp.*, 2361 N. 29th St., Milwaukee 10. The design features hexagon shaped tool bit holders to permit easy angular setting of tool bits, and positive locking means to maintain this setting. Angular setting of the tool bit holder is maintained even when the tool bit is removed for grinding. Positive clamping of the tool bit in the holder is by means of a tapered spacer, the clamping wedge and clamp screw so located in the cutter body that it receives no shearing stress. The cutter body is of heat-treated steel. Each separate tool bit may be ground and individually positioned to do a portion of the job. This cutter can do such operations as fly cutting, slotting, surface milling, straddle milling, form milling and other types of machining.

### Chrome-Aluminum Enamel

TEN-MINUTE-BAKE chrome-aluminum enamel having unusual brilliance and tough adhesiveness has been produced by *Norfolk Paint & Varnish Co.*, Quincy 71, Mass. Chrome - aluminum enamel achieves the effect of polished chromium with all of the high reflective quality of silver. Because of its flowing and leafing properties, it assures one-coat coverage of most surfaces. As a product coating it has non-settling, non - graying characteristics when allowed to stand in a dip tank or spray reservoir. The enamel may be applied by spraying, dipping, brushing or tumbling. The product may be baked over a wide range of temperatures, from 10 min. at 350° F to 30 min. at 250° F. Chrome-aluminum enamel is also available as a 1-hr. air-dry finish for use either as a product coating or as a maintenance aluminum finish.

### Diamond Dressing Tools

CLUSTER type diamond dressing tools, available from *Clipper Diamond Tool Co., Inc.*, 21 W. 46th St., New York 19, in R 20 and R 20-15 styles, have 20 small diamonds symmetrically inserted in a matrix and arranged in two circles of ten diamonds each. The inner circle is staggered in comparison to the outer, and the diamonds have been selected for their long, narrow form. The R 20-15 tool is designed so that the two circles of diamonds are set at 15°. When dressing the wheel three to five diamonds contact the wheel; and, after they become worn, the tool is turned 45° to expose new points. This procedure is repeated until all diamonds are worn beyond use and the tool is discarded. In tests, it is said, these tools have given high performance on straight dressing for production grinding.

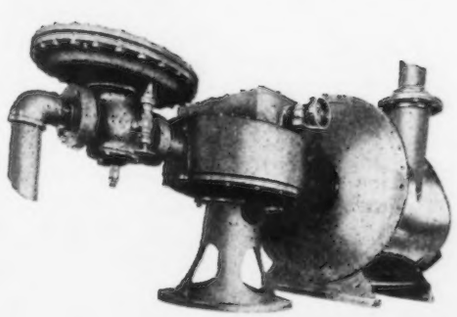
# WHEN You want

- BURNER PRESSURE, MODULATION, MULTIPLE FEED, UNIT ADJUSTMENT
- LOWER MAINTENANCE, ACCURATE OUTPUT, IN YOUR BUTANE-AIR PLANT
- EFFICIENCY AT ALL LOADS WITHOUT CONTINUOUS VALVE-TWISTING

# THEN You want Pressure-Carbureted KEMP Combustion

*The KEMP Industrial Carburetor gives You a precisely proportioned mixture, precisely uniform pressure, automatic response to overall or individual burner demand. It frees the "valve-twister" for productive work. In day-in-day-out service KEMP Carburetors build 15 to 20-year records of complete unpampered dependability. If you use Kemp Burners with them you have added perfection to perfection.*

## 6 SIZES 4500 TO 120,000 C. F. H.!



*Left to right: the Regulator reduces entering gas to 0 pressure; the carburetor mixes it with air in unchanging but adjustable proportion; the blower takes over the mixture and delivers it at desired pressure. At minimum or full capacity, automatically responding to demand, air-gas ratio is identical and fuel cost in exact proportion to heat units delivered.*

# KEMP of BALTIMORE

PRECISION CARBURETION + ADAPTED COMBUSTION FOR INDUSTRY'S HEAT USING PROCESSES
ATMOSPHERE GENERATION & ADSORPTIVE DRYER SYSTEMS
FOR PROCESS CONTROL AND PROTECTION

JMLco K-DD2-1A

C. M. KEMP MFG. CO.
405 E. Oliver Street, Baltimore 2, Md.

Send me literature on your Series S Carburetors ☐

Send your nearest engineer to discuss our firing system ☐

NAME_____

TITLE_____

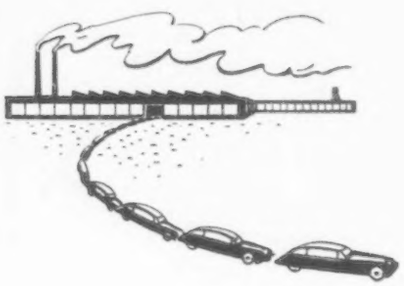
COMPANY_____

PLACE_____

# Assembly Line . . .

WALTER G. PATTON

**• Strike is possible in event of Chrysler-UAW wage stalemate . . . Increase in freight rate adds to auto producers' costs . . . GM report discloses huge expansion program.**



DETROIT—Informed sources in Detroit are predicting a strike will be called against Chrysler Corp. unless the union demands for a wage increase are met. This conclusion is based on the following arguments: (1) Chrysler has not had a big strike since 1937 when the issue was union recognition; (2) the number of employees involved (75,000 against 268,000) is more favorable than a GM strike from the union viewpoint; and (3) Chrysler earnings would justify (from the union viewpoint) a substantial wage boost and (4) Chrysler Corp. is large enough to establish a wage pattern that might carry throughout the industry and possibly into other industries as well.

The international executive board of the UAW-CIO has already authorized a strike in the event that the union wage demands are not met. Incidentally, the union treasury has been built up to the highest level in several years.

Unconfirmed reports indicate that the union has scaled down its demands from an original increase of 35¢ per hr to 18½¢. The union it is reported has rejected a Chrysler offer of 6¢ per hr. It has also been reported that the union has reduced its demand on GM from 25¢ per hr to 15¢ and an "adequate" pension plan. Like the reported Chrysler offer, this report is unconfirmed by either the company or the union.

The prolonged shutdown of GM 2 years ago makes it illogical as most observers here see the situation to expect GM workers to make the necessary sacrifice to establish the wage pattern the union is now seeking. In addition, the issue is clearcut in the case of Chrysler workers since only the wage clause is open for renegotiation. In the case of General Motors, an entirely new contract will be written, including the troublesome union shop clause which promises to become a formidable stumbling block in carrying on the wage discussions.

Most sources here see the recent union blast in the newspapers as a statement intended primarily for the consumption of UAW-CIO members and the public. Informed sources agree, however, that the GM position with respect to the union shop has been made clear in the steps the company has already taken. Moreover, past experiences has indicated that once it takes a position, GM is hard to move.

The present GM position is that all employees on the seniority list should be eligible to vote in the union shop elections. GM has insisted that all workers who have been employed since 1943 should be eligible to vote, thus making it more difficult for the union to obtain a majority. GM is also balking against holding the election in company plants. The corporation appears to be taking a position that it should lend no assistance in any form to the union drive to obtain a union shop in General Motors. While most sources believe the union would win such an election under most election conditions, it should be kept in mind that even after such an election is won the union shop then becomes a subject for collective bargaining rather than an accomplished fact.

THOSE close to the Detroit labor situation seem to share the opinion that the term 'labor negotiations" fittingly describes what takes place in a Detroit wage parley nowadays. Auto manufacturers realize that the union is entirely realistic as well as opportunistic in its wage hearings. They know that Walter Reuther is one of the most resourceful negotiators in the country. They do not under-estimate either his power or his ability. That is why most auto companies have built up strong staffs to conduct their wage negotiations.

With few exceptions, company wage representatives have developed negotiation techniques that rival the shrewdness of the union negotiators. While it may be argued that this is not an entirely satisfactory method of developing sound wage patterns—this is how the situation has developed over the years. Wage negotiations as they are conducted in Detroit today are tough, knock-down drag-out affairs. No punches are pulled by either side.

Until this point is grasped many of the statements in the press that are designed primarily to influence public opinion make little sense. When this situation is understood, then the sometimes bewildering moves on the auto labor chess board begin to be more apparent.

The 1948 wage negotiations in the auto industry promise to be as noisy and as hectic as any that have occurred in recent years. Of course, developments in the coal strike could change all of this overnight. However, barring outside factors, the industry seems to be settling down to a wage tug-of-war that will be anything but dull.

* * *

THE third increase in rail rates since last October which brings the total jjump in rates over the 1947 tariffs up to approximately 25 pct has the auto industry sharpening its pencils. Because of the complexity of rate calculations it is not possible to interpret the latest boost in terms of specific cost to a prospective new car owner. It may be concluded, however, that auto producers who do not operate branch assembly plants will be hardest hit by the new rates. This includes Chrysler Corp., Packard, Hudson and Kaiser-Frazer.

According to a reliable source, an average rail shipment of completed automobiles will run about 12,000 lb per car whereas parts may be packed into freight cars in such a way as to permit loading 30 to 60,000 lb per car. Rail rates for

# new Bullard type "K" economies widen scope of MULT-AU-MATIC method

**Higher Speeds Meet New Job Requirements.** Designed to lower production costs of small and medium sized jobs in cast iron, steel and light metal alloys, the new BULLARD Type "K" Mult-Au-Matic provides a wide range of spindle speeds up to 900 rpm to get full productive capacity out of modern cutting tools.

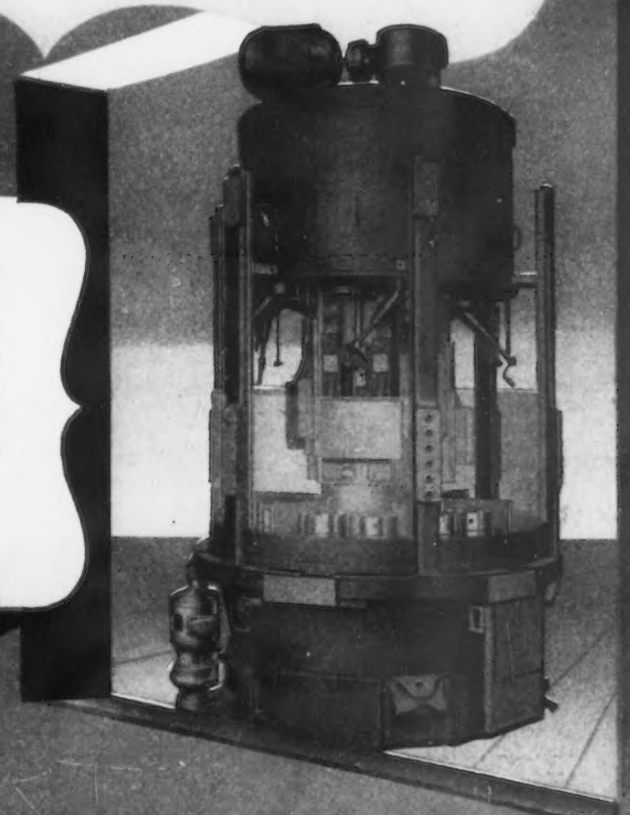
**Saves Time Between Cuts.** A newly developed index control mechanism permits faster return and advance of tool carrying heads and faster carrier index.

**Higher Degree of Accuracy.** New method of carrier index registry maintains repetitive accuracy from station to station, producing work to extremely close tolerances.

**Improved Hydraulic Chucking Increases Efficiency.** Work is chucked quickly by foot treadle control and automatically released as spindles return to loading station. Chucking pressure is adjustable to suit work characteristics.

**Twin Spindles Double Production.** Two of the four Type "K" models have twin spindles that deliver two finished pieces for every index cycle . . . a promise of lower production cost that is worth investigating further.

Write for complete information about the new Type "K" version of the Mult-Au-Matic method, one of the leading contributors to our modern American production system. THE BULLARD COMPANY, Bridgeport 2, Connecticut.



BULLARD Type "K" Mult-Au-Matics for work up to 10" in diameter come in four models: 6 or 12 spindles with speeds from 100 to 900 rpm, and 8 or 16 spindles with speeds from 98 to 880 rpm. 41 speed changes, 82 rates of feed, selective feeds and common speeds at all stations.

**BULLARD**

BULLARD CREATES *NEW METHODS* TO MAKE MACHINES DO MORE

parts are less than for assembled units.

One result of the latest freight boost will be to divert more car shipments from the railroads to haulaways. Current reports indicate that trucking companies are already handling a large percentage of the short-haul business. However, the economies in favor of trucking decrease, in most cases, are in proportion to the distance from Detroit. Since truck rates have not climbed as rapidly as railroad rates it is expected that the shipping equalization point has been shifted a considerable distance from Detroit during the past 12 month period.

At the same time, the freight burden on steel companies shipping steel into Detroit by rail will be increased another 5 pct although this will be offset to some extent by the recent increase in the Detroit arbitrary freight rate from 16 to 21¢ per 100 lb. The steel tonnages arriving in Detroit by truck (and by water during the shipping season), it is reported, has increased substantially in the past several years.

A study of GM's annual report to stockholders discloses some interesting facts that might easily go unnoticed even by those closely identified with the auto industry.

For example, total GM production of cars and trucks in 1947 aggregated 1,930,918, an increase of 64 pct over 1946 but 19 pct behind the 1941 total. GM's 1947 output was 5 pct above the average volume for the last prewar years.

For 1947 GM's passenger car sales accounted for 40 pct of the industry compared with 44 pct in 1937-1941. Chevrolet and GMC truck output amounted to 30 pct of the industry's total for 1947 compared with 39 pct in the 1937-1941 period. In its annnnual report, GM says that the supply of materials—particularly—sheet steel—was the principal limiting factor in auto production during 1947.

IT is interesting to note that whereas before the war the average age of all cars on the road was 5.3 years, the average age of cars in use at the beginning of 1947 had jumped to 8.5 years. The large number of over-age automobiles on the highway "should continue to have a stimulating effect on the new car market," according to the GM report.

It is also disclosed that during the past 2½ years GM has spent approximately $600 million for plant and facilities including special tools and equipment. (A continuing drain on GM's cash reserves for its huge modernization program may account for the recent sale of GM's holdings in North American Aviation and the reported sale of the GM interest in Greyhound Lines.)

The long list of GM plant expansions easily escapes the memory. Included in such a list would be the new Chevrolet-Fisher Body plant at Flint, and Van Nuys, Calif. Buick-Oldsmobile-Pontiac has a new assembly plant at South Gate, also in the Los Angeles area. During the past year Fisher Body also started production at its postwar plants at Kansas City, Atlanta and Wilmington, Del. The corporation virtually completed construction of a new plant at Framingham, Mass. Fisher also started operations in a new Ternstedt plant at Columbus, Ohio, for the manufacture of body hardware and interior fittings. A new plant at Hamilton, Ohio, for the manufacture of body panels and parts subassemblies was also completed.

During 1947 Fisher began for the first time to manufacture station wagon bodies at Cleveland. Other GM expansion programs included the extensive plant expansion and modernization for Buick at Flint, the addition of 17 acres of working space at Pontiac and a substantial increase in the forge capacity of Oldsmobile at Lansing.

GM Truck & Coach Div. has brought new facilities into operation during the past year, including a new engineering building. In its foundry divisions, a new plant at Danville, Ill., was nearing completion as the year ended. A new foundry was under construction at Defiance, Ohio.

THE growing importance of General Motors' Diesel Div. is emphasized in the 1947 report which discloses that total diesel horsepower produced in 1947 was 4,241,875—more than twice that produced in 1941.

The report points out that some American railroads are currently operating GM's diesel-powdered locomotives in highspeed passenger service more than 30,000 miles a month and in heavy-duty freight service more than 12,000 miles a month.

The report discloses that Allison Div. in Indianapolis is operating an aluminum foundry at Bedford, Ind. which is producing precision aluminum castings for a growing variety of uses.

In discussing GM developments and improvements, the report calls attention to the work of GM research technicians during recent years. Mentioned specifically in the report is the new method for testing the hardenability of steel developed during the war under A. L. Boegehold and Walter Jominy in the General Motors research laboratory. The report also mentions GM studies in the field of strength of materials, including the development of "shot peening" to increase the effective strength of parts and length of their useful life. This is probably the first time metallurgical developments of this kind have been given prominent mention in an annual report of GM Corp.

THE report also discloses that GM at the present time has "2200 engineers, metallurgists, chemists, physists and other technicians . . . concerned primaril with advanced engineering design and research." The report adds, "I General Motors, the importance of research is recognized and the b lief is encouraged that almos everything can and will be d ne better tomorrow than it is being done today."

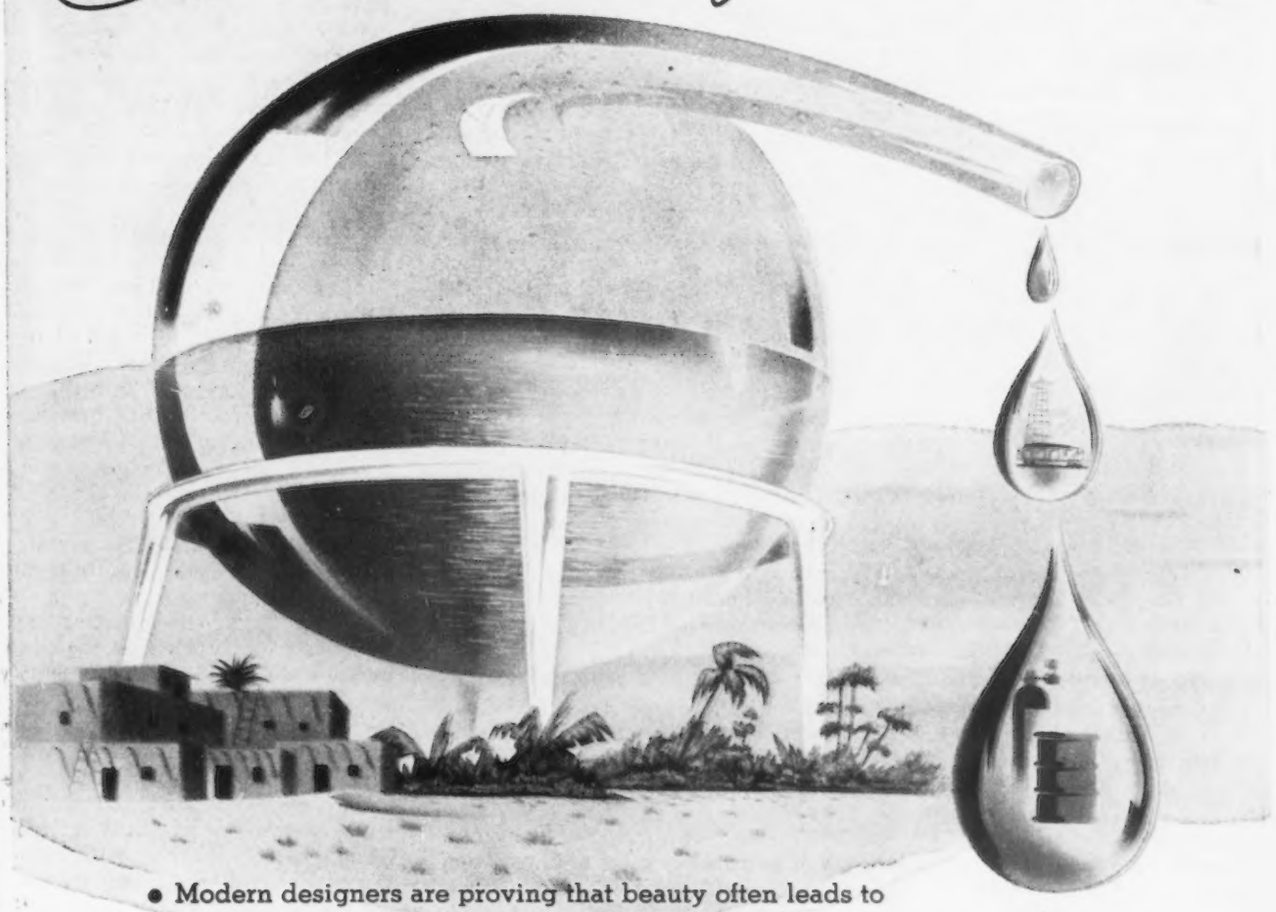
Average hours worked by GM hourly-rate employees in 1947 was 38.3 hr per week. Absenteeism and shortages of materials were responsible for the loss in hours of employment from the 40 hr schedule, the report concludes.

While the net sales of $3,815,159,163 were second highest in the history of the company and almost double the 1946 total GM's ratio of net income to net sales has fallen rapidly. In 1929 GM reported 16.5¢ of net income for every dollar of sales. By 1941 the ratio had dropped to 8.2; during the yea 1947 the figure was 7.5.

GM's payments under its bonus plan were the greatest in the history of the company totaling $29 million. However, it should be pointed out that no bonus was paid in 1946.

At year's end, Geenral Motors had 375,689 employees on its rolls. Aggregate payroll totaled $1,155 million.

# Quintessence of Utility

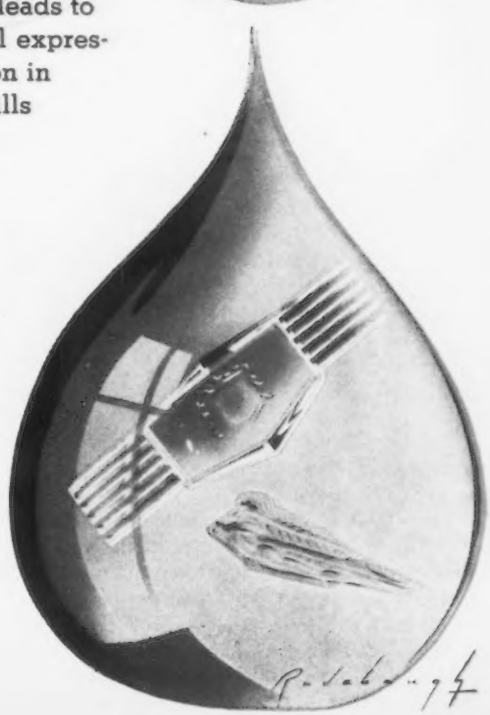


• Modern designers are proving that beauty often leads to the ultimate in utility. This new trend is finding full expression at Auto-Lite's great Bay Manufacturing Division in Bay City. Here under one roof are the technical skills and production capacity for a new art rendered in plastics including brilliantly colored elastomeric plastics, decorated metals and metal-plastic combinations. The artistic skill of Auto-Lite's Art and Style Division is available on matters of design and development.

**THE ELECTRIC AUTO-LITE COMPANY**

*Bay Manufacturing Division*

**723 New Center Bldg., Detroit 2, Mich. • Bay City, Mich.**



**Auto-Lite**

**plastics and metals**

AUTO-LITE MEANS PRECISION MANUFACTURING

Tune in the Dick Haymes Show for Auto-Lite, Thursday, 9:00 P.M.—E.T. on CBS.

# Washington . . .

EUGENE J. HARDY

**• "New Look" for voluntary allocations program . . . Key industries due for only small amounts of additional iron and steel . . . U. S. watches European steel group.**

WASHINGTON — The Commerce Dept.'s program for voluntary allocation of steel, pig iron and other materials to so-called critical areas of the economy has taken on a "new look" in the past few weeks.

Under this new policy, unless overruled by higher authority, Commerce's Office of Industry Cooperation will concentrate its efforts on getting "the most production from the least amount of raw materials." In other words, top consideration will be given to proper utilization of iron and steel now going to industries such as housing, petroleum equipment, and farm equipment.

The substantial loss of steel production resulting from the coal strike and the demands for European recovery and the rearmament program have brought about the realization that only very small amounts of additional iron and steel can be allocated to so-called key industries if the economy is to be kept in balance.

The first public announcement of this new policy came at the meeting of the steel warehouse and jobbing industry with Comerce officials last week. Commerce told the warehouse men that the meeting was called to determine the part steel distributors might play in channelling their present supplies to participants in voluntary agreements programs rather than to discuss increasing supplies now being shipped to warehouses by the mills.

With the freight car program now in good shape, the farm equipment program shelved temporarily; and the petroleum industry's astronomical requirements (THE IRON AGE, Mar. 25, p. 98) not yet formally presented to Commerce, OIC officials are now concentrating on the housing field. Meetings have been held with producers of cast iron pressure pipe, cast iron soil cast iron plumbing fixtures, cast pipe, steel prefabricated homes, iron low pressure boilers and radiation, warm air furnaces, and plumbing and drainage fixtures. Several additional meetings will be held in order to present the steel industry with a total bill of requirements for iron and steel for housing.

GENERALLY SPEAKING, all of these industries told Commerce that their full capacity could be utilized only if additional steel, pig iron, coke, and scrap was made available.

The petroleum industry program will probably be next in line. From an informal study of the industry's requirements, Commerce officials made it clear that nothing like the estimated quantities could be made available for this purpose. In some cases this industry has worked out requirements well above the overall capacity of the steel industry for the products in question. Some Commerce officials also express doubt over the ability of the petroleum industry to consume the 16.5 million tons requested for the coming 18-month period.

While Commerce is still in the dark on firm requirements for ERP and the rearmament program, OIC officials believe that these programs can be handled on a voluntary basis, provided there is a desire to cooperate.

The department also made clear within recent weeks that the voluntary program was not designed to bail out individual industries. The Steel Founders Society at a recent meeting with Commerce pointed out that present production of steel castings is using only 60 pct of the industry's capacity and suggested that steel castings might be used as a substitute for scarcer rolled products in the voluntary program. Commerce officials bluntly state that this is a job for company sales executives and not the government.

* * *

UNITED States observers are keeping a watchful eye on the Subcommittee on Iron and Steel of the European Economic Commission, established as a result of recommendations of the Western European Recovery Program area. When the committee was first suggested the United States expressed fears over its possible use as a device for reactivating the European steel cartel, which is now considered as legally in effect but presumably in a state of suspense in terms of operation.

A State Dept. observer told THE IRON AGE this week that the committee's work has given no indication of "materialization of U. S. cartel fears," and added that thus far the committee has "done some very positive work in helping to maintain steel production."

The committee has thus far concerned itself largely with such things as scrap collection, increasing the availability of metallurgical coke, obtaining materials for furnace linings, and other problems similar to those plaguing the U. S. steel industry.

ESTABLISHMENT of the committee within the European Economic Commission, a United Nations subsidiary, assures a broader representation, including European nations which are primarily steel consumers and possibly others not covered by the European Recovery Program. In addition, a representative from Bizonal Germany also observes the work of the committee, because of the prime importance of the German steel industry to the European economy.

The Steel Committee of the 16 nations destined to receive ERP aid also continues to function, but is concerned primarily with statistical gathering relating to the estimates and requirements of each nation eligible for ERP aid.

# if you surface-harden any parts in your plant

**1**

. . . Investigate the savings that Flamatic hardening has achieved on gears, pinions, spindles, cams, and countless other parts that lend themselves to rotation. Precision electronic temperature control permits rapid heating to within plus or minus 5° F. of desired value, followed by quench. Result: exceptional uniformity and closer control of hardness and hardness gradient than previously practical with flame hardening.

## only flamatic provides electronic temperature control

**2**

Flamatic not only means uniform results: it assures quick, easy adjustments to handle a wide range of parts. Work-holding fixtures and arbors are readily made, easily installed in machine spindle. Positioning of flame heads on screw slide requires no particular skill. Operator presets desired hardening temperature by means of dial in front of electronic temperature control instrument.

## only flamatic provides quick, easy, set-up changes

**3**

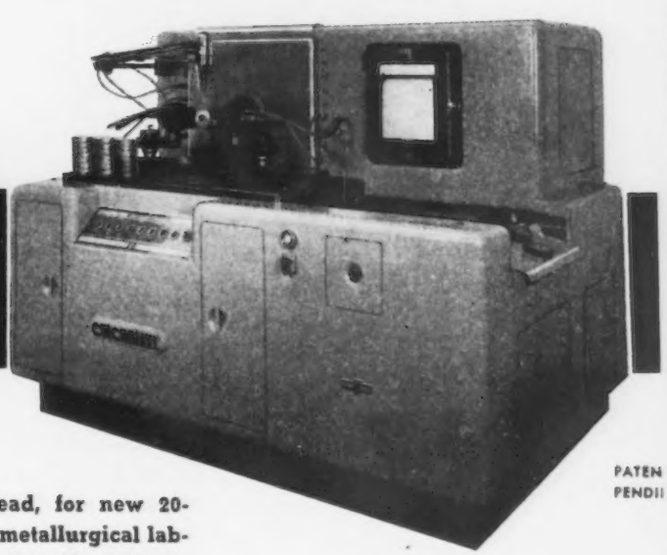
Flamatic machine is compact, occupies only 86 square feet of floor space, yet has extraordinary capacity. For instance: Flamatic hardens 4" diameter, 1" face, 6 DP spur gears at the rate of 250 parts per hour, with uniform results and excellent "physicals." All things considered – capacity, operating ease and speed, and excellence of results, the Flamatic hardening machine is definitely low in cost.

## only flamatic combines high capacity with low cost

THE CINCINNATI

# flamatic

HARDENING MACHINE



PATEN PENDI

**Write, on your letterhead, for new 20-page catalog, including metallurgical laboratory reports: Publication No. M-1611.**

CINCINNATI

THE CINCINNATI MILLING MACHINE CO., CINCINNATI 9, OHIO, U.S.A.

## Freight Increases To Boost Shipping Costs $300 Million Annually

*Washington*

• • • **Additional freight** rate increases, boosting shipping costs another $300 million annually, have been authorized by the Interstate Commerce Commission. These are expected to go into effect the first week in May.

This brings average overall adjustments since last October to 21.4 pct, however, total increases in freight rates with an estimated resultant increased annual revenue of $2.5 billion.

The present adjustment in effect brings the general increase since October 2, 1947 to about 30 pct within the eastern territory, 25 pct within southern territory as well as from, to, and within western zone 1 and also inter-territorially, and to 20 pct within the remainder of the western territory. The increases are subject to stated limitations.

Also, charges for protective services may be increased 10 pct while iron ore rates to upper lake ports may be boosted 10¢ a net ton and 11¢ per gross ton. Handling charges at such ports may be raised 18 pct.

Among commodities given exceptional treatment was lignite coal, with an authorized increase of 20¢ a net ton or 22¢ per gross ton ( supplanting January increases of 10 and 11¢).

The same January adjustment for anthracite and bituminous coal and coke will now be supplanted by the following: Where rates (including previous interim increases) are $1.15 or less per net ton and $1.29 or less per gross ton, 20 and 22¢, respectively, between $1.15 and $2.50 per net ton and between $1.29 and $2.50 a net ton and $2.80 per gross ton, 30 and 34¢, respectively.

Rail-water rates on coal and coke are subjected to a single increase, rates from Illinois mines to East St. Louis and Alton, for movement by barge to upper Mississippi points may be increased 12¢ a net ton.

Rates on iron ore, other than to upper lake ports, will now take increases limited to 25¢ per net ton and 28¢ per gross ton (supplanting January increases).

The increases on ores and concentrates of aluminum, copper, lead, zinc, and underground manganese and chrome ore will be limited to 30¢ per net and 34¢ per gross ton.

The limitation now imposed on the increase for iron and steel articles is 14c per 100 lb or $2.80 per ton, net or gross as rated. Specific items to which this applies includes knocked-down tanks, tank towers and tank materials. In this latter connection, the increase is conditioned upon a contemporaneous adjustment of the ex parte 162 increase in carload rates on the tank to a maximum to 10¢ per 100 lb.

Other exceptions include aluminum, copper, lead and zinc metals or alloys and items made of such metals or alloys. Like iron and steel article, these may not be increased more than 14¢ per 100 lb or $2.80 per net or gross ton.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

TELL YOU WHAT I'LL DO, CRICKIT-- IF YOU'LL LAY OFF OF BATTING AVERAGES FOR JUST THIS SUMMER, I'LL MAKE YOU MY ASSISTANT IN TH' OFFICE!
WELL, IT'S THE ONLY REAL FUN AN' ENJOY-MENT I HAVE!
IF TH' BULL THINKS HE CAN TURN ALL THAT MATHEMATICAL FUN INTO WORK, HE'S SILLY--FOR TH' MINUTE IT BECOMES WORK, HE WON'T DO MUCH OF IT.
OUTSIDE TALENT
4-30 J.R.WILLIAMS
COPR. 1948 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.

## Government Studies Means of Acquiring German Rubble Scrap

*Washington*

• • • **Government scrap** experts who have been studying avenues of acquisition leading to an estimated 10 million tons of German rubble scrap are now quietly exploring the federal subsidy route.

Whether or not Congress will feel disposed to vote subsidy funds for the purpose of buying the scrap from the German businessmen who now hold title to these huge reserves is problematical. Opponents of the idea point out that the British and Russian governments have been careful not to lose control of rubble scrap and hence have provided themselves with millions of tons from this source since the end of the war.

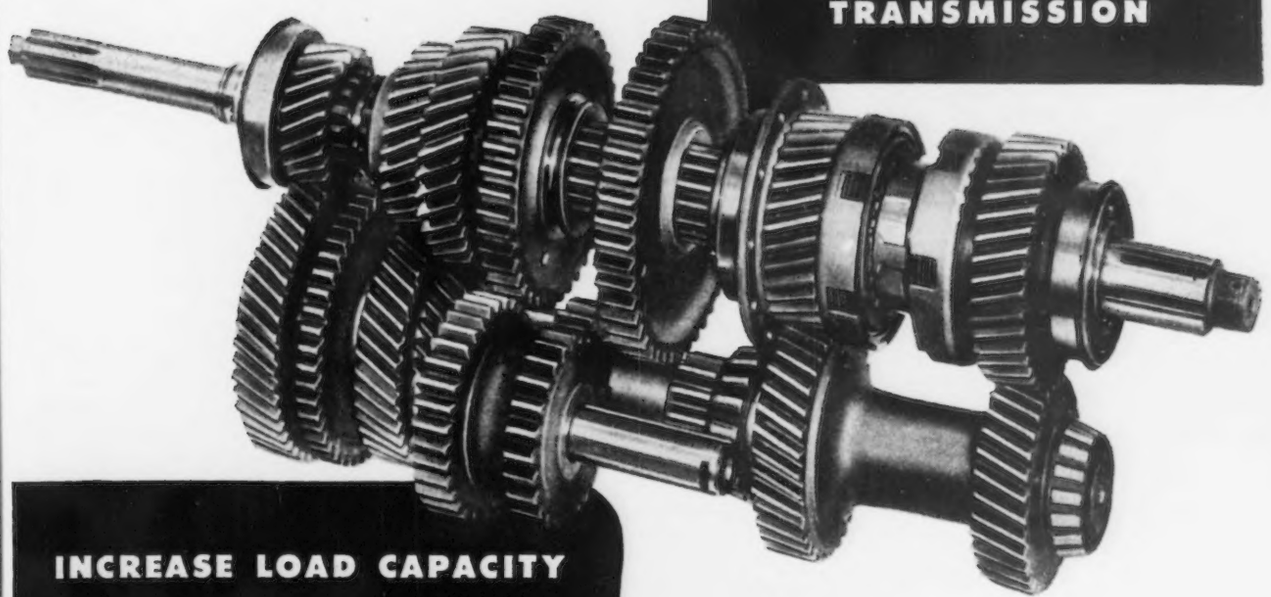
The United States allowed title to this scrap—which is in the form of damaged buildings, industrial works, and railroad equipment—to revert to the original German holders. The owners are unwilling to sell it to U. S. buyers for marks because of the unfavorable rate of exchange. And no U. S. buyer could profitably purchase and export the scrap for dollars.

If subsidy funds for scrap purchases are forthcoming, the question of extent then arises. Should the German owners be paid entirely in dollars? Partly in dollars and partly in marks? Partly in clothing and food? These are some of the questions now under discussion by officials in the Defense and Commerce Depts.

# *Take a Tip on Gears*

**...from this new**

**Mack 10-SPEED TRANSMISSION**



**INCREASE LOAD CAPACITY**

**RAISE IMPACT STRENGTH**

**ADD WEAR-RESISTANCE**

## *...with Nickel Alloy Steels*

These gears demonstrate basic advantages secured by using Nickel alloy steels . . .

Steels that not only provide increased resistance to shock and high tooth pressure . . . but, in addition, are readily machinable and respond to heat treatment with minimum distortion.

Pinions, gears and shafts of the Nickel-molybdenum steels used in this transmission provide exceptionally hard carburized surfaces over strong, tough cores.

Types 4620 and 4820 steels are supplemented by the use of 4320 Nickel-chromium-molybdenum steel for some parts.

High load carrying capacity, and the consistently long, dependable performance of Nickel alloy steels in heavy-duty service, make their economy self-evident. Improve your products or equipment by specifying vital parts in Nickel alloy steels.

EMBLEM OF INCO SERVICE
TRADE MARK

Over the years, International Nickel has accumulated a fund of useful information on the selection, fabrication, treatment and performance of engineering alloy steels, stainless steels, cast irons, copper-base and other alloys containing Nickel. This information is yours for the asking. Write for "List A" of available publications.

**THE INTERNATIONAL NICKEL COMPANY, INC.** 67 WALL STREET NEW YORK 5, N.Y.

# West Coast . . .

ROBERT T. REINHARDT

**• Standard warehouse stock list for suppliers of airframe industry simplifies inventories . . . Navy unveils giant "pea shooter" for hydrodynamic studies on torpedoes . . . Utah to get new centrifugal pipe plant.**

LOS ANGELES—West Coast warehouses supplying raw material items for the airframe industry have been able to reduce by 50 pct the quantities and varieties of raw material stocked, while not materially reducing the value or weight they keep on hand. In the light of the anticipated acceleration of production expected for the airframe plants in the months to come, this greatly improved supply system is particularly significant.

Improved supply has resulted from a project of the National Aircraft Standards Committee to compile a standard Warehouse Stock List for West Coast manufacturers and suppliers. The NASC, a unit of the Aircraft Industries Assn., adopted the project in 1946 as a result of suggestions by Northrop Aircraft, Inc., that preparation and use of a standard stock list would permit aircraft companies to make deviations—or substitutions of material specifications—before the production drawings were released instead of afterwards, when schedules are short. Northrop was appointed to conduct the project through its standards department, with Glen M. Aron, head of that department, as chairman of the Warehouse Stock List Committee.

In a nutshell, the aircraft companies agreed to eliminate many differences in choice of specifications, tempers, finishes and sizes and to specify materials from the Warehouse Stock List; the warehouses agreed to keep a constant supply of these materials on hand.

Aircraft companies obtain a part of their raw materials from warehouses, rather than mills, because of limited contracts and the length of time required for mill shipments. Warehouses have always found maintenance of adequate stocks most difficult because of the differences in buying practices of the different aircraft companies. For instance, as many as eight different types of the same diameter and wall thickness steel tube might be required because of variations in alloy, heat treat and finish. In the Warehouse Stock List, these variations already have been reduced to as few as two and, in some instances, to one.

Preparation of the stock list has been a major task, but it already has shown results. As an example of the work required to prepare the list, steel tubing suppliers voluntarily made complete inventories of their stocks and sales. These inventories were used by the Stock List Committee in its final discussions on tubing standards.

A subcommittee has listed the four major aircraft raw materials—alloy steel, stainless steel, aluminum and magnesium. Each list covers sheet, strip, plate, bar and tube stock. Duplications and near equivalents were eliminated by voluntary action of the two groups—buyers and sellers. The Stock List Committee expects to prepare copper and brass lists next.

With the "standard lists' prepared after months of voluntary effort, supply houses agreed to keep reasonable amounts of these preferred items on hand, aircraft engineering departments were asked to specify standard stocks wherever possible, and aircraft material departments began using the list in preparing material manuals and establishing their individual factory stock lists.

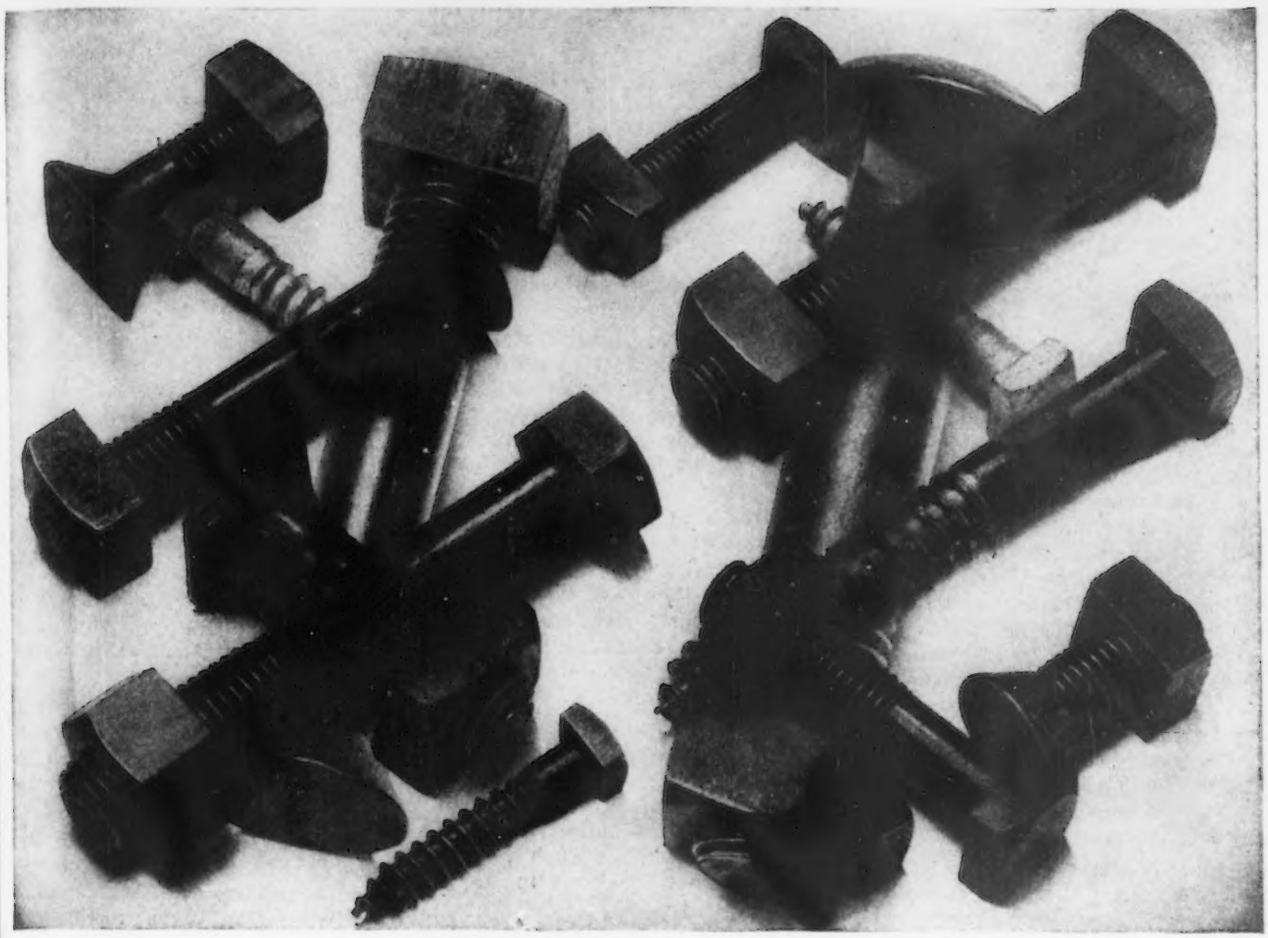
NOW, with the NASC Warehouse Stock List, supply companies are able to carry as few as 217 steel tubing items and still meet requirements of the industry. For example, the inventory of steel tubing suppliers revealed they carried a total of 220 different items on their shelves. Some of these items had been stocked for several years without a single sale.

With the number of items to be stocked narrowed considerably, warehouses are able to order more intelligently from mills and to assume safer risks in maintaining large inventories of particular items, Mr. Aron said.

Higher speeds of naval aircraft has posed a serious problem to Naval Ordnance which is being worked out at the Underwater Ordnance Test Range of the Navy at Morris Dam in the Sierra Madre Mountains near Pasadena, Calif.

After years of secrecy the Navy unveiled a steel and concrete structure believed unique which has been designed and built solely for the purpose of determining exactly what happens when a solid object such as a torpedo strikes the water. During World War II many a pilot's heart was broken when, after making a hazardous run on an enemy ship and launching his torpedo, it either broached or skittered off on an unpredicted course. It is the purpose of this new test range and affiliated laboratories to determine the hydro-dynamics involved in the launching of torpedoes at high speed and to effect improvements in design which will insure a higher degree of accuracy.

Since 1943 a fixed launching tube 300 ft long has been shooting torpedoes into the peaceful waters of Morris Dam Reservoir, but in order to more closely simulate actual launchings from high speed planes, a new variable angle structure costing between $1½ and $2 million was designed and built under the



# IT'S "t.f.e." TO STANDARDIZE FASTENERS

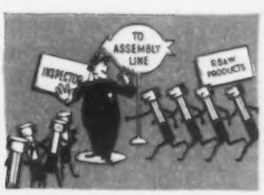
There are many ways you can cut fastening costs without sacrificing quality.

Experience has proved that *T*rue *F*astener *E*conomy is the lowest *total* cost of fastening . . . and that savings made in *indirect* fastening costs are greater than any possible saving in *initial* cost.

Standardizing fasteners throughout an entire plant has saved money in many places. Some RB&W customers have reduced variety of fasteners as much as 40% — with corresponding savings in cost of purchasing, receiving and stocking.

RB&W engineers will gladly assist you in a program of standardizing the fasteners used in your plant.

**FEWER PER ASSEMBLY.** Proper fastener specification, calling for stronger (hence fewer or smaller) fasteners, gives further savings in assembly time, machining and fasteners.




**QUALITY CONTROL.** Confidence in RB&W's quality control reduces need of plant inspection, and gives the user confidence in satisfactory performance of fasteners.

**COMPLETE LINE.** In addition to lag screws, machine, plow and carriage bolts (main illustration), RB&W offers a complete line of bolts, nuts, screws, rivets and allied fasteners.

t.f.e.

TRUE FASTENER ECONOMY
IS THE LOWEST TOTAL OF ALL
FASTENING COSTS

**RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY**

BOLTS · NUTS · SCREWS · RIVETS
RB&W
THE COMPLETE QUALITY LINE
& ALLIED FASTENING PRODUCTS

Plants at: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at: Philadelphia, Detroit, Chicago, Chattanooga, Oakland, Portland, Seattle. Distributors from coast to coast.

*103 Years Making Strong the Things That Make America Strong*

direction of the Naval Ordnance Dept.

TWO huge concrete ramps towering almost 250 ft up the opposite sides of a peninsula on the lake form a mammoth inverted "V." On the launching side of this ramp is located a 300-ft long bridge-like trestle of all welded steel construction, reportedly the largest of its kind in America. This testle carries the 300-ft long torpedo tube and one end of it can be raised up the 45° slope of the ramp, so as to permit sending test torpedoes into the lake at any angle desired to simulate actual flying conditions. The lake end of the trestle is supported on barges which float in toward the shore as the upper end of the trestle is raised. A 390 ton counter-weight on the other side of the inverted "V" assists electric motors to move the trestle and tube.

The general contract was handled by General Tire & Rubber Co. of Calif., who sub-contracted various units of the structure.

United Concrete Pipe Corp., of Baldwin Park, Calif., used approximately 400 tons of structural steel for the fabrication and erection of the launcher trestle, connecting bridge, barges, counterweight car, bridge support, carriage, and side view camera bridge.

Kinmont Mfg. Co. supplied drive machinery and the launching tube itself which is 22½ in. ID with a wall thickness of approximately 1 in. The interior of this tube is honed to rifle barrel smoothness. The tube itself weighs approximately 50 tons.

Pacific Crane & Rigging, Inc., erected the camera cable tower, overhead projectile crane, overhead camera suspension system, miscellaneous steel work and installed the drive machinery and main drive cables. This contract involved approximately 50 tons of structural steel.

Southwestern Engineering Co. fabricated a part of the launcher rail and used about 127 tons of steel rail for the purpose.

NORMAN I. FADEL constructed the concrete counterweight ramp, launcher ramp and superstructure and installed miscellaneous steel to the amount of approximately 183 tons.

The Long Beach Naval Shipyard fabricated the tank in which compressed air is stored and used about 50 tons of steel here.

This new unit is expected to be in operating condition within 2 months and in the meantime experimental work is being continued in the fixed launching tube. In demonstrations made last week, aluminum plugs simulating the shell of a torpedo, were launched to illustrate the terrific impact of a projectile striking the water at the speeds they will face through launching from high speed planes. These aluminum plugs are cast from alloy 356 and have a wall thickness of approximately ½ inch. These test units completely shatter upon striking the water.

None of the missiles used for tests and demonstrations contain explosives as the primary purpose of the research is to determine the hydrodynamic forces exerted.

Impact of torpedoes striking the water at terrific speeds has actually shattered some torpedoes in tests and investigation is under way to determine the most effective metallurgical analysis for such projectiles as well as to determine their size and shape.

In laboratory work at Pasadena the Ordnance Dept. of the Navy is conducting scale model tests, similar to the field tests, wherein models of one to 12 ratio are projected into tanks of water and high speed photographs made to study exactly what happens. Other tests involve the dropping of revolving balls from considerable height and photographing the effect with stroboscopic light.

Commander H. D. Hilton, USN, is officer-in-charge of the Pasadena Div. of the Underwater Ordnance Div. and Dr. A. H. Warner of Inyokern, Naval Ordnance Test Station, Calif., heads the experimental operations department.

SALT LAKE CITY—Officials of the Pacific States Cast Iron Pipe Co. have announced plans to build a new centrifugal pipe foundry at Ironton at an estimated cost of $2½ million.

The construction contract has been let to F. H. McGraw Co., of New York, and it is expected that work will be started within 60 days and completed within 10 of 11 months.

The new addition will be located near the company's present plant and administrative offices. It will enable the firm to switch from sand casting to the more efficient spinning method of manufacture and broaden the range of products. At present the maximum size pipe produced by the company is 12 in. in diameter and 18 ft long. The new foundry will produce sizes up to 24 in. and 18 ft long. Production in the old plant will be continued pending completion of the new unit.

Arrangements have been completed with Geneva Steel Co. for an enlarged supply of pig iron.

The pipe company is a subsidiary of the McWane Cast Iron Pipe Co. of Birmingham. The original Ironton plant was built in 1926 and has been enlarged since that time. In 1946 facilities were built for the production of 5 ft soil pipe and some specialties such as hydrants and valves.

The new foundry, officials said, will not increase operating personnel, although employment will be substantially increased during the period of construction.

Start on the installation of the 182-mile 10 in. and 8 in. pipe line from Rangely, Colo., to Salt Lake City is expected early next month now that Pacific Pipe Line & Engineers, Ltd., of Los Angeles has been awarded the contract. Operation of the pipe line is scheduled for this fall.

## Steel Boat Sales Boom

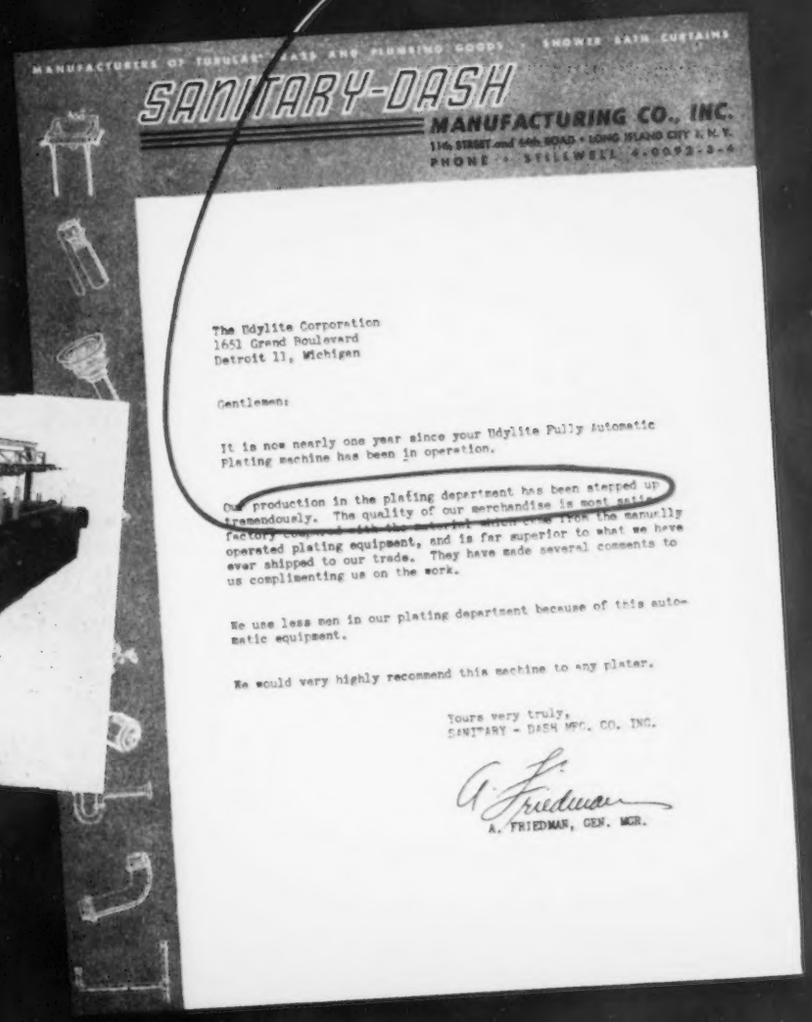
*Pittsburgh*

• • • **A West Haven,** Conn., boat builder who turned out 600 lightweight welded steel boats in 1946 plans to make 2500 this year. The 26-ft. Steelcraft vessels are built by Churchward & Co., Inc., of welded steel on an assembly line.

The hulls are fabricated of Jones & Laughlin's Otiscoloy, a high strength low alloy steel, said to permit the ship to be 12 pct lighter in weight and 20 pct stronger than one made of the former gage carbon steel.

Greater seaworthiness, less maintenance, and more usable hull space are among the advantages cited for steel over wood construction. Steelcraft prices include a utility boat at $2682 and twin stateroom sedans starting at $4100.

# "... production in the plating department has been stepped up tremendously!"



SANITARY-DASH MANUFACTURING CO., INC.
11th STREET and 44th ROAD • LONG ISLAND CITY 1, N. Y.
PHONE ... STILLWELL 4-0092-3-4

The Udylite Corporation
1651 Grand Boulevard
Detroit 11, Michigan

Gentlemen:

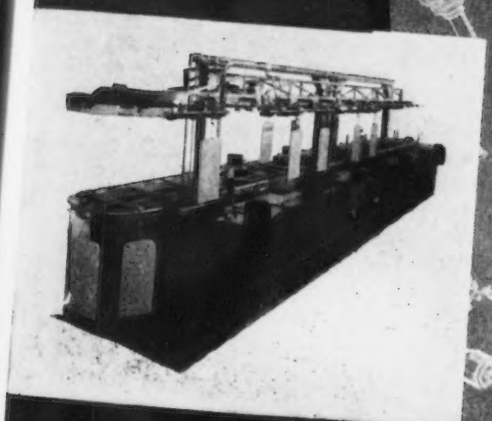
It is now nearly one year since your Udylite Fully Automatic Plating machine has been in operation.

Our production in the plating department has been stepped up tremendously. The quality of our merchandise is most satisfactory [illegible] with the [illegible] from the manually operated plating equipment, and is far superior to what we have ever shipped to our trade. They have made several comments to us complimenting us on the work.

We use less men in our plating department because of this automatic equipment.

We would very highly recommend this machine to any plater.

Yours very truly,
SANITARY - DASH MFG. CO. INC.
A. Friedman
A. FRIEDMAN, GEN. MGR.



This Udylite Fully Automatic Machine turns out as high as 100 racks per hour, producing uniform finishes to laboratory exactness.

● Let Udylite Plating Machines and laboratory-tested supplies bring these important advantages to your operations! There is a Udylite machine for every need—small plant or mass-production line — small parts or large. Udylite will gladly analyze your operations, test your solutions, and advise you, entirely without obligation. Write today. The Udylite Corporation, 1651 East Grand Blvd., Detroit 11, Mich.

PIONEER OF A BETTER WAY IN PLATING . . .

THE **Udylite** CORPORATION

TESTED SOLUTIONS TAILORED EQUIPMENT AUTOMATIC CONTROL FOR METAL FINISHING

# PERSONALS

THOMAS S. NICHOLS, president, Mathieson Chemical Corp.

• **Thomas S. Nichols** has been elected president and chief executive officer of the Mathieson Chemical Corp., formerly the Mathieson Alkali Works, New York. **George W. Dolan,** formerly president, has been elected chairman of the board. **A. U. Fox,** former chairman, has resigned. **John C. Leppart** has been elected vice-president of the company. Mr. Nichols comes to Mathieson from his position as vice-president and director of the Prior Chemical Co. Mr. Leppart also comes to Mathieson from the Prior Chemical Co. which he had joined as vice-president in 1947.

• **H. F. Schwarting** has been appointed assistant district manager of the American Car & Foundry Co.'s Madison, Ill. plant. He had previously been general electrical engineer with headquarters at ACF St. Louis plant.

• **Robert L. Lowder,** formerly district sales engineer at the Link-Belt Co.'s plant in Atlanta, has been appointed district sales manager in charge of a new office in Jacksonville, Fla.

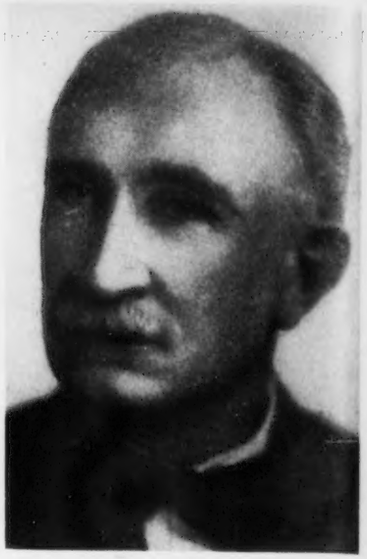
• **Fred G. Hodell** has been elected a director and vice-president of the National Screw & Mfg. Co., Cleveland, following the merger of the Hodell Chain Co. **Charles F. Newpher** has been elected executive vice-president.

• **Ralph M. Overton,** who has been on the staff of the vice-president-engineering and operations, U. S. Steel Corp. of Delaware, has been appointed assistant vice-president-operations of National Tube Co., Pittsburgh. **T. H. Kennedy** has been appointed general superintendent of the company's National Works at McKeesport, Pa., succeeding E. G. Price. Mr. Overton, formerly superintendent of National Works, joined National Tube in 1924. Mr. Kennedy joined National Tube as assistant superintendent, blast furnaces at National Works in 1940 and in 1946 became assistant general superintendent of National Works.

• **W. T. Morris,** former assistant superintendent of maintenance, Youngstown Sheet & Tube Co., Youngstown, has been appointed superintendent of maintenance. **Bernie K. Askew,** former general foreman of power house repairs, succeeds Mr. Morris as assistant superintendent of maintenance. **Harry Weckerly** succeeds Mr. Askew as general foreman of power house repairs. Mr. Weckerly was formerly night general turn foreman. **William B. Brophy** has been named general turn foreman at the coke plant. **Herman E. Muller,** former roll designer at the McDonald plant of Carnegie-Illinois Steel Corp., has been named assistant roll designer for Youngstown Sheet & Tube Co.'s Youngstown district.

• **J. J. Buckley** has been elected president of Pacific Tube Co., Los Angeles. Since 1944 Mr. Buckley has held the position of vice-president and general manager of the company. **E. H. Lloyd** has been elected vice-president. He has been with the company since 1943, and has been plant superintendent since 1944. **G. C. McEvoy,** formerly assistant treasurer, has been elected treasurer.

• **Harry L. Showalter** has become associated with the Erie Foundry Co., Erie, Pa., as sales representative in eastern Pennsylvania, New Jersey, Maryland and Delaware. Mr. Showalter served with the Navy during the war.



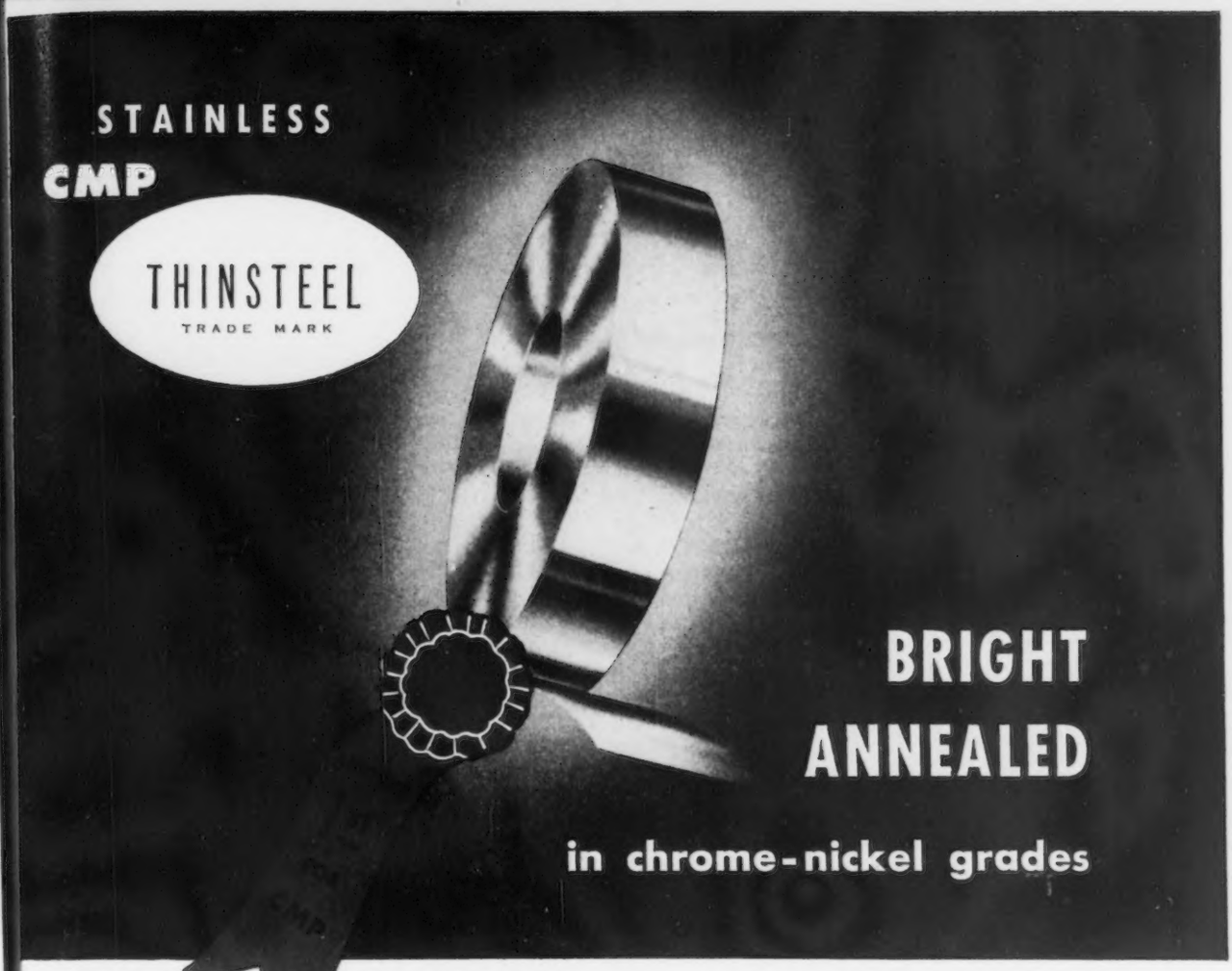
PETER D. WHITE, president, Babcock & Wilcox Tube Co.

• **Peter D. White** has been elected president of the Babcock & Wilcox Tube Co., New York. Mr. White has been with the Babcock & Wilcox organization 33 years. During the past year he has been executive vice-president and a director and was previously a vice-president for 5 years. **Luke E. Sawyer,** who has been general superintendent of the Tube Co. since 1939, has been elected vice-president and general manager. He has been with the organization 37 years. **E. A. Livingstone,** who has been general sales manager since 1939, has been elected vice-president in charge of sales. He has been with the company 18 years.

• **Omar V. Greene** has been promoted from assistant general sales manager to manager of product development of the Carpenter Steel Co., Reading, Pa. **H. Sturgis Potter** has been promoted from manager of tool steel sales to sales manager in charge of all Reading products.

• **Walter H. Lewis,** formerly assistant manager of orders, has been appointed manager, order department, Jones & Laughlin Steel Corp., Pittsburgh. Mr. Lewis came to J&L in 1936. **Paul L. Tietjen** has been appointed to the new office of director of water transportation, Jones & Laughlin Steel Corp. Mr. Tietjen continues as manager of Interstate Steamship Co., a subsidiary of the corporation.

(CONTINUED ON PAGE 147)




# NOW you can reduce finishing and polishing costs

Heretofore such a high finish, common to annealed straight chromium grades of type 430 stainless, could only be obtained on annealed chrome-nickel grades like type 302 by polishing the strip or fabricated product as a last operation. *NOW*—CMP 18-8 stainless Thinsteel can be furnished in annealed temper with a bright lustrous finish. To users of light gauge chrome-nickel stainless strip steel, the opportunities for reduction in finishing and polishing costs will be readily apparent. This is a NEW product and NEW applications for it are now being developed. We will welcome the opportunity to demonstrate how CMP Stainless Thinsteel can enhance the beauty and utility of stainless strip products while reducing the cost of the finished product.

**COLD FACTS ON THINSTEEL**

- **EXTRA LONG COILS** ... less downtime
- **EXTREMELY CLOSE TOLERANCES** ... more parts per ton
- **WIDE RANGE OF PHYSICALS AND ANALYSES** ... tailored for your products
- **GAUGES THIN AS .001"** ... strength with lightness

C M P STRIP STEEL — PRECISION COLD ROLLED

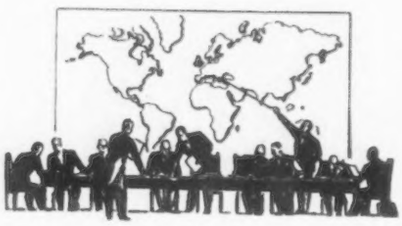
the **Cold Metal Products co.**

YOUNGSTOWN 1, OHIO

NEW YORK • CHICAGO • DETROIT • ST. LOUIS • BUFFALO • INDIANAPOLIS • LOS ANGELES • SAN FRANCISCO

# European Letter . .

**• There can be no permanent division of Germany into spheres of influence . . . Germans cannot be won by economic bribes alone.**



LONDON—Gen. Sir Brian Robertson's speech at Duesseldorf on Apr. 7 marked one more definite stage in the development of joint Anglo-American—indeed, of Western European—policy toward Germany. Its significance was largely obscured in the press of the world by the mounting toll of incidents between the occupying powers in Berlin and Vienna; if the Russians were deliberately trying to muffle the announcement of a decided change in policy, they certainly succeeded. Perhaps also what General Robertson had to say came as something of an anti-climax because it has obviously been coming ever since the Conference of Foreign Ministers broke down last December.

But it is nevertheless an event of great importance when the Germans are told that the last attempts to secure the unity of their country have proved vain and that a German government will be established in the Western zones as soon as agreement is reached with the French. The delay of 4 months has had the incidental advantage that the European Recovery Program is now law and General Robertson was able to link his bitter demand that the Germans should recognize the division of their country with the news that their coming State would not only share in the flow of Marshall dollars, but would enter the permanent organization to be set up as successor to the Committee for European Economic Cooperation and enjoy the benefits of membership of the Western Union.

PERHAPS it was too much to expect the Germans to show any enthusiasm at this news. Certainly there has been no rejoicing; it has rather been received with sullen indifference. Their reaction should point a valuable lesson for the countries of Western Europe and for the United States which, it should never be forgotten, is a great Western European Power today, by virtue of its occupation of Germany and of the influence it will wield through ERP.

The lesson is that Germany cannot be treated as just another example of the existing split between East and West and classified on one side or the other, since here the dividing line runs not along a national frontier, but through the heart of a country. It is true, and important, that the Germany east of the iron curtain is only one-third of the Germany west of that barrier, and that so far as the political and economic climate goes, it might be Tashkent or Magnetogorsk that lies across the dividing line instead of Leipzig or Jena. But they are the same Germans on both sides. This simple fact means that there can be no permanent division of the country into spheres of influence. Everywhere else in the world it is possible to imagine an agreement to disagree between Communism and Democracy, between Moscow and Washington, with a line drawn that both parties would accept and observe. But this cannot be done in Germany. There, in the end, Moscow must win the West, or the West must win the East. The present iron curtain only marks the line within which forces—in the West, at least, they are peaceful forces—are now being built up.

*Reprinted from The London Economist by special permission.—Ed.*

It is a hard battle which will have to be fought in the West, as the jaundiced reception of General Robertson's pronouncement showed. The warning is clear. The Germans cannot be won by economic bribes alone. An increased flow of food and raw materials is indeed essential. But it is not enough. The Germans accept such benefits as their right, as a grossly inadequate compensation—which has still to materialize—for the harm done to them by being the "innocent victims" of rivalry among their conquerors.

BUT if to give the Germans material benefits is insufficient, to give them back their political sovereignty, and to do that alone, would be dangerous. The logic of Anglo-American policy is driving in that direction. But it might prove to be fatal if the conception should take hold in London and Washington that realistic policy consisted solely in building up German heavy industry, in forming the centralized state that efficiency demands, and even eventually in arming a new German Wehrmacht—for which the first demand has just been voiced by a German political leader in Frankfurt.

The danger of such a policy lies not only in the alarm it would engender among Germany's neighbors—leading perhaps to a fatal withdrawal of their cooperation—but also to the probability that it would create exactly the type of German state which would be open to Russian bribery.

So long as the ideas governing German actions are those of the absolute rights of the state over the individual, of nationalism, of military power and of Germany's sacred right to expand, so long will Russia hold out a lure which will become potent once the reconstruction of the Soviet Union is far enough advanced for economic concessions to be made to the Germans in the Eastern zone.

# MORE STEEL COMING FOR DSC CUSTOMERS

## Here's How We're Going to Have More Steel for You . . .

**Dependable Dan Our Customers' Man Invites Correspondence Regarding Your Normal and Regular Requirements**

Frankly, we may be unable to accept new business now, but looking ahead, we would like to keep you informed about our expanding facilities.

Now under construction . . . a big, new cold rolled strip mill in New Haven, Conn., scheduled to begin rolling by October 1, 1948 . . . to give Eastern customers 60,000 tons additional producing capacity . . . practically at their stockroom doors.

Improvements at our Detroit Mill to step up that unit's producing capacity to 150,000 tons a year . . . to increase the supply of cold rolled strip available to Midwestern customers by about 35,000 tons a year.

### *And D.S.C. Reminds You . . . .*

That our Detroit mill . . . our Reliance Division network and our Craine-Schrage Steel Division will continue to do everything possible to keep your production rolling . . giving every account equitable consideration . . . constantly planning and working toward greater production and supply . . . and towards higher standards of steel service.

## DETROIT STEEL CORPORATION

PRODUCERS OF
COLD ROLLED STRIP STEEL

DETROIT 9, MICHIGAN

## RELIANCE STEEL DIVISION

**PROCESSORS AND DISTRIBUTORS OF JOB-FITTED SHEET AND STRIP STEEL**

*General Office:* 1025 South Oakwood Ave., Detroit 25, Mich.
*Plants:* Chicago, Cleveland, Detroit, Lyndhurst, N. J., Worcester, Mass.
*Sales Offices:* Grand Rapids, Indianapolis, New Haven, Philadelphia, St. Louis, Toledo
*Products:* SHEETS—Hot Rolled . . . Hot Rolled Pickled . . . Cold Rolled . . . Long Terne . . . Galvanized; PLATES; COLD ROLLED STRIP STEEL—Coils and Cut Lengths . . . Slit or Round Edge . . . All Tempers.

★ ★

## CRAINE-SCHRAGE STEEL DIVISION

**DISTRIBUTORS AND DIRECT MILL REPRESENTATIVES**

*Warehouse and General Office:* 8701 Epworth Blvd., Detroit 4, Mich.
*Sales Offices:* Grand Rapids, Toledo, Indianapolis
*Products:* Cold Drawn and Hot Rolled Carbon and Alloy Steel Bars . . . Tool Steels . . . Drill Rod . . . Wire Rope, etc.

# Industrial News Summary...

- ***U. S. Steel Move Far Reaching***
- ***Other Steel Firms Are Surprised***
- ***Freight Rate Advance Hits Steel***

IN the face of one of the heaviest freight rate increases and the possibility of bigger coal costs later this year the steel price cutting move by U. S. Steel looms as a far reaching decision. There is no evidence that it was political. It was not to meet steel price competition. There was no price cutting in steel to meet.

Neither was it to offset a bad public reaction to the semifinished steel price increase more than a month ago. That increase was due solely to a loss in producing that type of material and the fear by some customers that such a loss would mean a withdrawal of semifinished steel from the market. The increase took care of that situation.

A price cut in steel coincident with a refusal to raise steel wages was a point of discussion among U. S. Steel brass before the increase in semifinished steel prices took place. There was no relation between the two items. But U. S. Stel had to decide if the relation they have built up with steel labor would stand the outright refusal of a wage increase even though some steel officials were privately sympathetic to the reasons for the wage demand.

The decision was no easy one. There was no assurance that companies selling raw materials to U. S. Steel will reduce their prices. Equally serious to U. S. Steel is the certainty that they will not know what gamble they have taken on their employee relations until the time for the next labor contract comes up.

THERE is resentment in steel labor circles. This is true because coal miners have almost always been able to get what they asked for. U. S. Steel will face this resentment next year. It seems certain this week that 2-year contract periods are out the window. It was this part of the contract that tied Philip Murray's hands. With a firm "No" he could do nothing but accept and charge that there had been no real collective bargaining on the wage question.

U. S. Steel Corp., whether its plan is an immediate success or not, has smashed to smithereens the third round of wage increases in the heavy industries this year. No other steel company will raise steel wages for the simple reason that in the past they have followed Big Steel. The auto raises in the past have not had the prestige for the union that the steel industry raises have had. It looks as if, despite the possibility of strikes in the auto industry, there may be no raises of any kind there.

Some large influential basic company had to stop somewhere on wages—U. S. Steel took the lead. But more surprising was the cut in steel prices. Such a move had not been looked for by other steel firms or steel consumers. Some leaders have stated that no wage increases were warranted but increases in prices were. The move was far more surprising to those steel officials than to others.

The pledge of B. F. Fairless, that if prices keep moving upward his people will have to revise their thinking, is not mere talk. It means just what it says. It is a serious part of U. S. Steel's policy because of higher steel costs facing steel firms this week. And it is a part to watch in the future.

For a great many steel companies the new freight rate boost will add 50¢ to the cost of raw materials going into a ton of finished steel. Some will get off easier but others figure it nearer to 75¢. Under present circumstances it is not likely that this increase will immediately be passed along to the consumer.

SINCE mills are loath to give away steel the alternative most frequently used is to withdraw from areas where freight costs are too high. Recent freight rate increases forced many mills to stop selling in a number of key areas when they found they were absorbing too much freight to serve customers or meet competition in those communities. It is a foregone conclusion that further withdrawals are coming.

Coaking coal, limestone, pig iron and scrap rates are also increased substantially. Freight on ore will also rise sharply. Coupled with the recent 65¢ per gross ton iron ore price boost some mills will pay at least $1.50 more for the ore needed to make a ton of finished steel than they did in February.

The new rate on steel products—50 pct higher in the East than in late 1946—will have its most serious effect on fabricators who have been depending on mills at some distance from their plants. A scramble to turn up new sources to replace suppliers forced to withdraw from distant markets is in the making.

One out for mills and customers will be increased use of truck and water shipments. This will be particularly true in the Midwest where 20 pct of steel shipped to consumers within 300 miles of the mill now rolls by truck. Pittsburgh mills are also planning to increase truck and water hauls.

The steel ingot rate advanced to 85 pct this week, up seven points from last week's revised rate of 78 pct.

The scrap market this week was strong in all areas. The coal strike failed to produce a downward movement in prices. Since that market is a free one it is not likely that the move on the steel price front will have any effect on scrap prices. The long term outlook for scrap still indicates a shortage of the metal when matched against the expected output of steel this year.

• **BASING POINT DECISION**—The Supreme Court this week in a 6-1 decision held illegal the use of the basing point system in the cement industry. The court said that in the application of the basing point system all sellers "quote identical delivered prices in any given locality regardless of their different costs of production and their different freight expenses." It added: "Thus the multiple and single systems function in the same general manner and produce the same consequences—identity of prices and diversity of net returns." Justices Douglas and Jackson did not participate in consideration or decision of the cases. Justice Burton wrote a dissenting opinion.

• **REPORTED DIVIDENDS**—Publicly reported cash dividends by the iron and steel industry for the first quarter 1948 rose nearly 20 pct, from $58.3 million to $71.3 million, over the first quarter 1947, according to the Office of Business Economics. This is representative of manufacturing as a whole where published dividend payments amounted to $694 million. Mining dividends showed the greatest rise, 68 pct to a total $48 million for the three months. Nonferrous metals showed a small gain, from $25 million last year to $26.2 million. Divided payments reported by other industry groups included automotive manufacturing, $68.5 million (last year, $52.6 million); machinery, including electrical, $103.5 million ($89 million); railroads, $54.3 million ($49.4 million); wholesale and retail trades, $116 million ($101 million). Monthly totals for all business: January, $527 million; February, $199 million; and, March, $595 million. About 60 pct of total dividend payments are publicly reported.

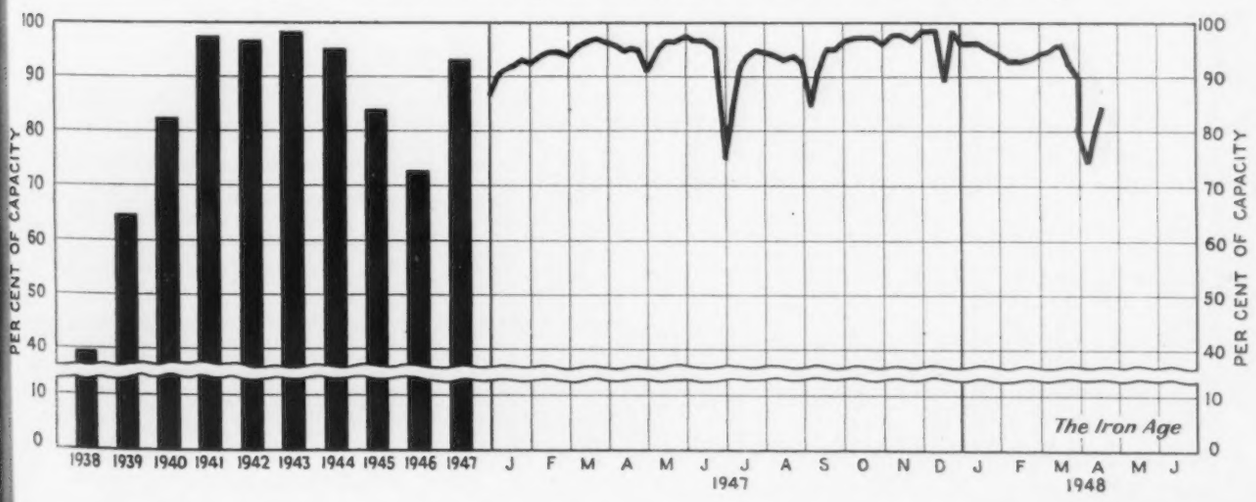
• **REPRIEVE**—Higher British steel output is a factor in the reprieve of several automobile manufacturers who were threatened with being closed down because of failure to obtain the 75 pct export quota. These firms are makers of specialist vehicles and they have been pressing their claims on the Ministry of Supply. They pointed out that their vehicles carry a prestige value for British engineering and bring in more dollars per ton of steel used than mass-produced cars. Their arguments appear to have borne weight as several of them have had their export quota cut.

• **WHODUNIT**—The New York Central Railroad's experience on the boiler plates of the new Niagara type engine, built 2 years ago, has been sad. American Locomotive built the barrel of the 280 lb pressure boiler using a fully killed carbon steel normally called silicomanganese, by railroad men, which is not in any sense of the word an alloy. All recent research points to a manganese vanadium alloy as the best bet for this application as precipitation aging appears to cause the trouble. After a dozen or so of the boilers started cracking, NYC top officials held an emergency conference with Carnegie-Illinois Steel officials. The cracked boiler plate originally furnished to ASTM, A212, were replaced with carbon steel to specification A201 but in a much thicker gage. Also, the replaced boilers were all welded construction. The metallurgists are still shaking their heads over the steel choice. The only recommendation they can make for carbon steel in this application is—it's more expensive in the long run.

• **ORE CONSUMPTION**—Consumption of Lake Superior iron ore by U. S. and Canadian blast furnaces totaled 6,634,243 gross tons in March, according to monthly report of the Lake Superior Iron Ore Assn. March consumption compares with 6,440,586 gross tons consumed in February and 6,979,204 gross tons consumed in March, 1947. Iron ore stocks on hand at furnaces and Lake Erie docks totaled 16,022,253 tons Apr. 1, compared to 22,628,022 tons March 1 and 17,411,010 tons Apr. 1, 1947. Blast furnaces depending principally on Lake Superior iron ore totaled 155 in the U. S. and 9 in Canada. Idle furnaces number 27 in the U. S. and 1 in Canada.

• **SEEKS SIMPLIFICATION**—Walter L. Maxson, research vice-president, Oliver Iron Mining Co., warns that the period of multiple grades of high quality ore, blended to exact specifications, is ending. Asking furnace operators to share the problems of the ore dresser, he cited 158 separate grades of ore specified in 1944 which included many "overlapping duplications." Blast furnace operators, he said in discussing taconite concentration, may well project their thinking forward to the time when the proportions of fine-structure concentrates will arrive in agglomerated form, either nodulized or sintered.

## *Steel Ingot Production by Districts and Per Cent of Capacity*




| ...ld of | Pittsburgh | Chicago | Youngstown | Philadelphia | Cleveland | Buffalo | Wheeling | South | Detroit | West | Ohio River | St. Louis | East | Aggregate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 29 | 81.0* | 83.5 | 67.0 | 77.0 | 94.0* | 68.0* | 73.0* | 70.0 | 102.0 | 73.0 | 55.0 | 77.5 | 102.0 | 78.0* |
| 27 | 91.5 | 86.5 | 71.0 | 87.0 | 92.5 | 76.0 | 89.0 | 88.0 | 102.0 | 74.5 | 76.0 | 77.5 | 98.0 | 85.0** |

...ised
...tative

## Increase your production 33%

*with equivalent steel tonnage*

USE **J&L OTISCOLOY**
HIGH-TENSILE STEEL

The elimination of 25% of the dead-weight of many products is possible through use of J&L Otiscoloy High-Tensile steel instead of carbon steel. Several manufacturers have taken advantage of this saving in weight and with Otiscoloy are producing one-third more units per ton than with an equivalent tonnage of carbon steel. Write for information on how to increase your unit production with less steel.

**J&L STEEL**

**JONES & LAUGHLIN STEEL CORPORATION**
PITTSBURGH 30, PENNSYLVANIA

# TEXAS STEEL INDUSTRY-*MARKETS*

***ONE ALONE:*** *Only fully integrated steel plant between the Mississippi River and the Rockies is Sheffield tide water plant at Houston, capable of producing 600,000 net tons of ingots annually.*

*Houston*

• • • **The chief difference** between industry in Texas and the rest of the country is simply the difference between growth and maturity. This is particularly true of the steel industry which as yet cannot be considered a major business. Steel is still an infant when compared to oil, gas, chemicals and cotton—staples of the state's economy.

Industrial postwar growth of the Lone Star state totally eclipses that of any other single area, with the possible exception of the West Coast, and is not just plain talk. You can see it everywhere. Skyscrapers continue to pop up in Houston and Dallas. By any yardstick, power consumption, employment, building permits, water connections, bank clearings, or what have you—Texas is in the process of a modern industrial revolution and every business knows it and has recognized it except the steel industry. Given the benefit of the doubt, possibly the steal industry is cognizant of the facts, no steel producer except Sheffiield Steel Corp. has done anything about it.

## Steel Consumers' Need Not Recognized In Growing Industrial State

By D. I. BROWN
*Chicago Regional Editor*

Steel consumers in the area don't like the treatment they have received. They accuse the industry of adhering too closely to the prewar distribution pattern in setting up customer quotas. Their claim is that the proper allowances for the growth of metal consuming plants in the area have not been recognized in the present steel distribution policies of the major producers. The prescription most often heard to cure their troubles is "Get a Texan on the board of directors of Big Steel and then maybe we'll get somewhere."

Sheffield Steel Corp., an affiliate of the Armco Steel Corp., has made a lot of friends in the area. The faith which the company had in the ultimate steel market of the state has materialized. To the purchasing agent who has been forced to buy from all other mills away from the area on a prewar restricted quota, take it and like it, f.o.b. mill basis, Sheffiield's meager but increased participation has been the salvation of many steel consumers.

The Lone Star state is fairly jumping with an activity and enthusiasm utterly foreign to that found in the large industrial sections of the north or east. A million dollar refinery installation is peanuts. More than 40 pct of the postwar chemical plant construction installed in this country is scattered along the Gulf Coast. In 1946 the nation's power consumption ran 56 pct ahead of 1939. For Texas alone in the same period power consumption was up 111 pct.

It appears that the market research divisions of the steel pro-

ducers have almost entirely overlooked the state. This is strange considering that durable goods industries have shown a terrific increase. Such industries, nationwide, showed a total employment of 57 pct more workers in 1946 than in 1939. In Texas these same hard goods firms employed 101 pct more people over the same period. Last year the national increase was 79 pct— in Texas employment by metalworking plants was up 213 pct.

Manufacturers of metal goods have moved in making everything including stoves, tanks, machinery, fabricated steel sections, etc. Houston, the main manufacturing area, has overflowed practically all of Harris County which has now become a densely populated industrial area. Recent newcomers such as Graver Tank, Browning-Ferris Machinery, Croft Steel Products Co., McCormick Steel Co., Chicago Bridge & Iron, Western Electric Co., Westinghouse Electric, Hammand Tank Co., represent but a few of the cross section of newcomers who have built new facilities in the Houston area alone.

Plate demands in Texas have increased many times over prewar needs. The A. O. Smith Co. pressure vessel plant at Houston, next door to Sheffield, is on rations as far as plate is concerned. A. O. Smith has also jumped into the fabrication of butane and propane tanks commonly called LPG (low pressure gas) requirements. This recent and booming business represents in itself a tremendous new outlet for plates. An estimated 250,000 such tanks are at present installed in Texas alone. The rest of the Southwest are heavy users of the same type of installation. To date, 27 Texas factories have been licensed to make tanks and they are all short of plates.

One twist of the LPG market is that butane, which was first used as a household fuel, is now being switched to the manufacture of gasoline. Gasoline makers are willing to pay more than 4¢ per gal. The LPG industry is thus switching to propane which is still cheap and available. However, butane systems call for tanks to withstand about 75 psi pressure while propane tanks must stand 150 psi. New installations, therefore, are in heavier tanks and existing systems are being changed over. Aside from the tanks installed in homes and buildings, the storage and transportation of these fuels has shown an additional large demand for more plates.

For some time the Pennsylvania shipyard at Beaumont has been rebuilding cargo boats into multitank storage vessels to handle both fuels. Bethlehem has very recently acquired these facilities and it is reported the yard will eventually become a large fabrication shop. Consolidated Steel Co., originally with a plant at Orange, has recently bought 75 acres on the Houston ship canal for approximately $125,000 to be used as the site for another fabrication shop.

Wyatt Metal & Boiler Works at Houston, an old time consumer, told THE IRON AGE they have not been receiving enough plates to meet their present demand. Much of the refinery demand is in specialized steel such as stainless and alloy, but garden variety plates of all sizes are very short in this area. Structurals follow automatically this plate demand, or vice versa. Mosher steel Co., the largest independent fabricator and biggest tonnage user in Texas, has a large backlog.

Texas consumes by far the largest chunk of pipe, be it line pipe, drill pipe, casing or alloy refinery pipe. Oil well drilling and application in 1947 totaled 11,327 wells or 2606 more than in 1946. The total this year will be much higher. About $300 million for chemical production plants was spent in the Lone Star state during the war. Last year an additional $400 million went for the same purpose. The Texas petroleum industry has earmarked a cool billion for expanding facilities this year.

Better utilization of natural gas, another cornerstone of Texas industry, is rapidly materializing. A $19 million synthetic gasoline-chemical plant is under construction by Carthage Hydrocol, Inc., near Brownsville. All eyes of the gas industry are focused on this plant. If it proves a success, Texas will have a new, many million dollar infant to contend with. All this —and not a pipe mill in the state!

Sheet demands are growing. Stove companies have sprung up around Tyler. Bryant Heater Co. is one of the largest plants recently built in this area. Lennox Furnace Co. has a new plant in Ft. Worth. Western Stove Co. of Culver City, Calif., is another newcomer to the state. Flat-rolled sheet has yet to show its full potential but it appears to be coming. Officially, steel producers, including Sheffield Steel Co., do not believe the state can support a strip or sheet mill. Off the record, other officials and observers voice their personal opinion that the Texas area can easily support the production of a moderate sized sheet and strip mill.

The price of steel laid down in Houston varies widely and directly with freight rates. All steel product prices paid by Texas consumers are f.o.b. mill, with the exception of Merchant products. One large warehouse reported buying plates from five different mills with but two identical prices. The table lists the present delivered Houston price on plates, shapes and bars. It may appear unusual that Sheffiield's price is the highest of any supplier on shapes and plates, and second highest on bars. Skyrocketing scrap prices have been a large factor in Sheffiield's price. The company has had other high cost operations to put up with, one being the use of an inferior coking coal. Texan steel users appreciate Sheffiield's position. Eventually, it is believed the Houston plant will be competitive in price with many of the products made in the large producing areas. Sheffiield is operating under an ever increasing freight umbrella which in a more normal market may give them the edge on certain products.

Steel distribution in the state of Texas, even from the best sources, is fragmentary. There are no steel industry statistics available for steel distribution on a state basis. For some time, pressure has been exerted on AISI to get all the producers to report their shipments by states. As yet, this project has not been launched principally because of the opposition of two of the

(CONTINUED ON PAGE 122)

**STEEL PRICE COMPARISON DELIVERED HOUSTON**

Dollars per Cwt.

| Shipping Points | Shapes | Plates | Bars |
|---|---|---|---|
| Houston (Sheffield Steel) | $3.98 | $4.23 | $3.73 |
| Birmingham | 3.424 | 3.574 | 3.524 |
| Sparrows Point | 3.76* | 3.91* | 3.71* |
| Pittsburgh | 3.85** | 4.00** | 3.95** |
| Chicago | 3.56 | 3.71 | 3.66 |

* All water, 20c cwt less.

** If hauled by barge, rate approximately 20 pct less than the $1.05 per cwt all rail rate.

## Fairless Says:—

• **B. F. Fairless,** U. S. Steel head, in announcing that the USWA had been denied a wage increase countered with the information that U. S. Steel would cut prices on a "wide variety of its steel products." He estimated total price reduction by the corporation at about $25 million based on last year's shipments of products affected.

"Reductions will so far as possible be applied to steel products that have a more or less bearing upon the cost of living. Semifinished steel will not be cut," Mr. Fairless said, but added that the following products would: Cold rolled sheets and strip, tinplate, wire and wire products, roofing and siding sheets, galvanized sheets and stainless steel. Mr. Fairless also indicated that other products would undoubtedly be added to the list.

"We are hopeful that our action in reducing the prices of a number of steel products associated with the cost of living may have a beneficial effect throughout the nation. . . ." It won't, Mr. Fairless admitted, unless industry generally cooperates. He recalled that Ford and International Harvester had both tried price cutting without success and General Electric price reductions were still in effect.

"If," said he, "costs should continue to advance, then in fairness to our employees and to our stockholders we will have to consider at some later date the adequacy of both wages and steel prices under then existing conditions." Mr. Fairless said it was impossible to estimate that probable date.

## Value of Steel Price Cut Rests on Action of General Industry

By TOM CAMPBELL
*News-Markets Editor*

*New York*

• • • **Credit for the** steel price cutting move goes to Ben Fairless. It bears out all statements he has made on prices and wages. It was and is sincere. Just as sincere is his warning that if prices to his company continue upward he will have to reconsider his position.

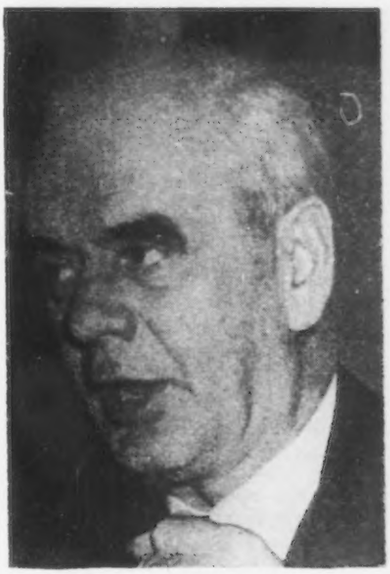
Phil Murray's inability to get a raise for his steelworkers stems from the 2-year limit placed on the last contract. It is for sure that the next steel contract will not be for more than a year. Being the type of a labor leader who keeps his word Mr. Murray could do absolutely nothing when the Corporation decided to say "no" to a raise.

But steelworkers will do plenty of thinking about what has happened to other workers, and to the miners in particular. Some in the field look for wildcat strikes. It is doubtful that they will blossom. It is more likely that all resentment will be welled up—to come out next year when a new contract is written.

The United States Steel people by okaying Mr. Fairless' "no-raise-but-a-price-cut" stand have produced more than a $25 million blow to inflation. A 10¢ an hr wage boost would have cost U. S. Steel about $50 million. If the whole steel iindustry adopts U. S. Steel's lead potential savings to the public will be more than $225 million a year.

If industry in general follows U.S. Steel, General Electric and Westinghouse the inflation bubble is shattered or badly deflated. But if that does not happen the steel price reduction will be withdrawn—and maybe the wage question will be reopened. That's what Ben Fairless intimated.

## Murray Says:—



• **Philip Murray,** United Steelworkers' head, commenting on the wage negotiations which ended Apr. 21, cited the "staggering profits" of U. S. Steel in 1947 and said that the Corporation "sees fit to deny to its steelworker employees a just and much needed wage increase. . . . Real wages have declined. . . . The high cost of living is a household reality. . . . We greatly regret that the U. S. Steel Corp. has refused to share its prosperity with and to recognize its responsibilities toward its employees. . . ."

He added that the Corporation used the "moderate" 1947 wage increase as "the untenable excuse to raise prices three times as much as the direct cost of the wage increase."

"We charge that the Corporation has not negotiated in good faith."

Referring to U. S. Steel's decision to reduce prices he said: "Any price decrease is welcomed. We are forced, however, to label this decrease for what it is, namely, a picayune decrease, . . . an obvious gesture intended to overcome the unfavorable reaction to the February price increases. . . ."

"Although the union is skeptical that this insignificant decrease will have any substantial effect in reducing prices generally we offered to delay final action on the wage issue until the effect of this price decrease could be measured." He said the Corporation refused a signed agreement on this point but concluded by saying that the union would live up to its no-strike contract.

# Industrial Briefs . . .

• SOLID SENDER—Two new sealless type coolant pumps, designed for general circulation duty and machine tool application, have just been announced by Allis-Chalmers. One is a vertical submerged and the other a side wall mounted type, both of which are low-head, single-stage types close-coupled to the motor. Both pumps are available in ¼ to 1 hp sizes, 1 and ¼ in., 10 to 70 ft heads, 1725 to 3450 rpm.

• BUILDING A FOUNDRY—Plans have been announced for the construction of a centrifugal casting pipe foundry and office facilities as an addition to the Pacific States Cast Iron Pipe Co., Provo, costing approximately $2.5 million. Pig iron and other materials will be furnished by the Geneva Steel Co.

• EXPANDS—The A. B. Murray Co., Inc., Eliabeth, N. J., has announced that it has opened an additional warehouse and shop for the distribution and fabrication of tubular steel products in the Pittsburgh district at Versailles, McKeesport.

• SCIENTIFIC CENTER—The Western Society of Engineers has established an engineering and scientific center at 84 E. Randolph St., Chicago, which other organiations of similar interests and professional standards will be invited to share.

• OPENS WAREHOUSE—A. Milne & Co. has announced the opening of a tool steel warehouse in New Britain, Conn., at 172 Stanley St.

• ACQUISITION—Bloom Engineering Co., Pittsburgh, manufacturers of industrial and steel mill furnace burners, have purchased the Paulsen Engineering Co., Cleveland, makers of blast furnace gas burners for stoves and boilers.

• OPENS WAREHOUSE—Bethlehem Supply Co. of California has formally opened its new general offices and warehouse at 6000 Alcoa Ave. in the Vernon district of Los Angeles. Wendell Jones, vice-president and general manager is in charge of the new facilities.

• ADDS ANOTHER—Levinson Steel Sales Co., Pittsburgh, which recently added Reynolds aluminum products to its stock, has taken on another non-ferrous line. The warehouse is now a distributor for Chase Brass & Copper Co.'s complete line of mill products in the Pittsburgh area.

• TO RECEIVE AWARD—M. E. Coyle, executive vice-president of General Motors, will receive the 1948 Parlin Memorial Award given by the Philadelphia chapter of the American Marketing Assn. for his contribution to the science of marketing.

• WEST COAST AGENT—The Tabor Mfg. Co., Philadelphia, has announced the appointment of Snow & Galgiani, 533 Second St., San Francisco, as their representatives in the state of California north of Fresno.

• MOVES—Luria Engineering Corp. has moved its Boston office to the Chamber of Commerce Bldg., 80 Federal St.

• OPEN HOUSE—More than 3000 customers served by the U. S. Steel Supply Co. attended the open house formally opening its warehouse at 311 S. Sarah St., St. Louis.

• ADDS TO PLANT—The Hays Corp. has added a new manufacturing building to its Michigan City, Ind., plant. The company fabricates panel boards for automatic combustion control and electronic instruments.

## TEXAS STEEL MARKETS

(CONTINUED FROM PAGE 120)

larger producers. U. S. Steel Corp. is making a state distribution survey for the years 1946 and 1947. This report will be finished by September, but even then the state breakdown will only be available on U. S. Steel Corp. shipments.

In 1939 the best guess seems to be that the industry shipped 1,625,000 net tons of finished steel products into the state. This includes only direct mill shipments of finished mill goods and does not include steel fabricated into some type of goods elsewhere and then shipped to Texas for consumption. The best estimate of shipments of steel in 1947 into the state is between 2 and 2½ million net tons.

In 1939 an official figure on tubular goods shows 444,000 net tons of oil country pipe, 64,000 net tons of standard pipe and 93,000 tons of line pipe shipped to the Lone Star state. Again, the best sources estimate 1947 distribution on these products are at least doubled—but no one is sure. Based on an IRON AGE prewar estimate of finished steel shipments to Texas and employing the only available data, it appears that 1947 shipments into the state were very close to 2,700,000 net tons, or about 4.1 pct of the country's total finished steel production last year.

## Competitive Bid Sale

*Washington*

• • • **About $70 million** of surplus iron and steel, nonferrous metals and valves and fittings, the remainder of its original $800 million inventory, will be offered on a competitive bid basis between now and June 30, according to War Assets Administration.

The exception is any steel sheet and standard size pipe which may turn up as inventories are firmed. these will remain subject to fixed prices and priority basis.

While WAA as yet has no reliable figures on breakdown as to the three individual groups, it said iron and steel constituted the largest single category.

# Special Report . . .

## Human Relations Program Gets Glad Hand From Union

*Pittsburgh*

• • • **A big** CIO steel union recently gave a dinner to honor its shop stewards and the *company's department heads.* In almost any steel mill employing 6500 an invitation to such a dinner, coming at this time from a United Steelworkers local, would be a shock.

But to the men who run Allegheny Ludlum and its Brackenridge plant it was only a mild surprise. Something like it had been in the making since late 1946 when the company started something new in steel mill industrial relations. Since then this specialty steel producer has cut grievances to a new low, improved community relations, sold a city on getting a war-surplus plant pushed its way, increased productivity and cut accidents. And there have been only two wildcat strikes in the past 2 years.

In 1946 there were 283 grievances filed among the company's 12,000 employees. Of these, 19 went all the way to arbitration for settlement. This was a record low for the company. But in 1947 there were only 194 grievances, 6 of which went to arbitration.

Since the big 1946 steel strike Allegheny Ludlum has had just two wildcat strikes. One involved 14 men and lasted 2 hr; 75 workers took part in the second and stayed out a week until union leaders ordered them back.

"Many members of organized labor seem to be imbued with the idea that their union card is a permit to steal, a permit to lay down on the job, a right to short-change their employers by not giving an honest day's work for an honest day's pay . . ." A message from the company president? No, part of an editorial from *Straight Forward News,* published by local 1196, USWA-CIO, the local to which the Brackenridge workers belong.

What has the company done to deserve this? Allegheny Ludlum (1) pays well and (2) explains what makes the wheels turn.

Informed observers doubt that wage scales are much, if any, higher at this specialty steel producers' plant, but the higher skills needed bring Allegheny Ludlum workers about $4 a week more than the average for the entire steel industry. Social benefits top those of most steel mills. The company pays all costs on a $4000 life, accident and health policy for each worker. It foots the bill for hospitalization too, for the worker and his entire family.

These are undoubtedly important . . . but many companies pay such premiums and still have poor labor relations. Clark W. King, vice-president, who masterminds, the program, sums up its theme as "simplification of information". To make it possible, management must be 100 pct sold on the idea. To make it work, management must get behind it 100 pct and push.

In January 1947, when the program got into full swing, management also realized that it would not work if they shied away from an idea because it was new, looked a bit undignified or had been done differently for 35 years. They started by replacing the old annual report with one easy to understand. Besides regular distribution of this first report requests for 7500 additional copies were received from outsiders. Then A-L scrapped the old safety booklet with its list of "rules" and "orders." All other old forms that went to employees were junked. In their place went bright new booklets, livened by humor, dotted with cartoons and plainly writen. "If the sweeper in the mill won't understand it, rewrite it!" is the rule today.

The quality of labor management relations is hard to measure. Most authorities agree that a friendly attitude, mutual respect and a desire to cooperate count heavily in the profit picture. If it does then a few recent examples of this spirit should be cited. In the course of this spring's management tour to company communities workers at two towns went out of their way to tell management they appreciated their way of doing business.

Early in April of this year employees at the Watervliet (Albany) N. Y., plant presented company president Hiland G. Batcheller with a scroll in appreciation of company actions on their behalf. Every single employee at the plant had signed it. At Brackenridge, the USWA-CIO local invited top management to a dinner which according to the engraved invitations was in honor of shop stewards (union) and superintendents (company). Speeches and conversation there indicated an unusual spirit of mutual respect and understanding among management and labor.

Alleghany Ludlum's program to develop better relations in plant communities actively started in January 1947. It's theme, which has been carried on in all phases of the industrial relations program ever since is: (1) We try to meet our responsibilities to our employees and to the communities in which they live. (2) We pay good wages. (3) We make fair profits. (4) We want to prevent "Boom and Bust."

*For further details on the community relations program see THE IRON AGE, Jan. 23, 1947, pp. 41 and 116.*

This year Mr. Batcheller and six vice-presidents made a trip to every plant community. Participants dubbed it the "flying circus" because they hit four towns in 4 days. Once arrived they took the stage of the biggest auditorium in town, invited

(CONTINUED ON PAGE 125)

***• • • In industrial relations circles the word is that Allegheny Ludlum Steel Corp., Pittsburgh, has a remarkable labor relations program. The company has received hundreds of requests for more information on it. Several companies already have programs patterned in whole or in part on the Allegheny Ludlum plan. Here in brief is how it works and what it has accomplished.—Ed.***

By GEORGE F. SULLIVAN
*Pittsburgh Regional Editor*

## Presents Estimates Of Steel To Be Shipped Under Foreign Aid

*Washington*

• • • **European Recovery** Administrator Paul Hoffman last week estimated that the maximum quantities of steel which the United States could ship to Europe under the aid program during the 15 month period ending June 30, 1949, at 1,714,000 metric tons of finished and 803,000 tons of crude and semi-finished. Steel in the form of machinery and equipment would amount to another 1,250,000 metric tons.

These initial estimates, presented to the House Appropriations Committee, are considered the maximum quantities that can be supplied by the United States, based on current knowledge of European needs and U. S. availabilities. They are subject to change on the basis of additional information received this week in the European nations letters of intent and the export control policies of the Dept. of Commerce.

The estimates also reveal that the United States is not expected to furnish any scrap, tin or aluminum, and 9000 tons of pig iron in the second quarter only. Canada is expected to contribute substantial quantities of pig while scrap will come entirely from sources other than the Western Hemisphere.

As shown in the accompanying table the estimates were prepared on the basis of second quarter 1948 expected shipments and, in addition, the full fiscal year beginning June 30, 1948. Estimates of other important industrial commodities are as follows:

| | 1948 Second Quarter | 1948-49 Fiscal Year |
|---|---|---|
| Coal | 6,210,000 tons | 30,136,000 tons |
| Copper | 15,000 tons | 58,000 tons |
| Lead | 6,000 tons | 22,000 tons |
| Zinc | 11,000 tons | 44,000 tons |
| Electrical Equipment | | $95,000,000 |
| Petroleum Equipment | | $226,700,000 |
| Farm Machinery | | $136,300,000 |
| Coal Mining Machinery | | $81,900,000 |
| Other Machinery | $113,700,000 | $451,300,000 |
| Trucks | $9,768 | $38,825 |
| Other Vehicles | $41,900,000 | $201,400,000 |
| Freight Cars | | $20,000 |

Note: All tonnage figures are in metric tons.

## CIT Man Speaks Abroad

*Pittsburgh*

• • • **Dr. Robert F. Mehl,** head of the department of metallurgical engineering at Carnegie Institute of Technology, will deliver the Hatfield Memorial Lecture in London, England, May 5, it was announced here.

### Maximum Anticipated Imports From United States

(thousand metric tons)

| Countries | Second Quarter 1948 Finished Steel | Second Quarter 1948 Crude & Semi-Finished Steel | Fiscal Year 1949 Finished Steel | Fiscal Year 1949 Crude & Semi-Finished Steel | Steel Equipment (millions of dollars) |
|---|---|---|---|---|---|
| Austria | ..... | ..... | ..... | ..... | 4.2 |
| Belgium-Luxembourg | 35 | 30 | 60 | ..... | 5.1 |
| Denmark | 29 | ..... | 80 | ..... | .5 |
| France | 32 | 32 | 225 | 69 | 13.8 |
| Greece | 13 | ..... | 35 | ..... | ..... |
| Iceland | ..... | ..... | 3 | ..... | ..... |
| Ireland | 3 | ..... | 15 | ..... | .4 |
| Italy | 12 | 26 | 50 | 255 | 4.5 |
| Netherlands | 100 | ..... | 250 | ..... | 4.6 |
| Norway | 44 | 4 | 100 | ..... | 2.5 |
| Portugal | 12 | ..... | 59 | ..... | ..... |
| Sweden | 49 | ..... | 197 | ..... | ..... |
| Switzerland | 50 | 4 | 86 | ..... | ..... |
| Turkey | 9 | ..... | 36 | ..... | ..... |
| United Kingdom | 26 | 91 | 104 | 292 | 28.5 |
| Western Germany Bizone | ..... | ..... | ..... | ..... | ..... |
| Western Germany French Zone | ..... | ..... | ..... | ..... | ..... |
| Western Germany Saar | ..... | ..... | ..... | ..... | ..... |
| Total | 441 | 187 | 1300 | 616 | 48.1 |

## Construction Steel . . .

• • • **Fabricated steel awards** in recent weeks include the following:

**5500 Tons,** Childersburg, Ala., newsprint mill for Coosa River Newsprint Co., to Virginia Bridge Co., Birmingham.

**660 Tons,** Winnebago County, Ill., bridge section 42F State of Illinois to American Bridge Co., Pittsburgh.

**260 Tons,** Cumberland County, Ill., state highway bridge section F-X-F to American Bridge Co., Pittsburgh.

**220 Tons,** Hall County, Neb., bridge S58-3-1 State of Nebraska to Capital Bridge Co.

**200 Tons,** Moline, Ill., building for Herman Nemson Corp. to Rock Island Bridge & Iron Co., Rock Island, Ill.

**150 Tons,** Buffalo County, Wis., bridge section State of Wisconsin, through A. Guthrie Co., St. Paul, to Bethlehem Steel Co., Bethlehem.

**130 Tons,** Richmond, Ind., bridge 2929 State of Indiana, to Bethlehem Steel Co., Bethlehem.

**120 Tons,** Chicago, building for the Hertz Drive-ur-Self Co. to Wendnagel & Sons, Chicago.

**70 Tons,** New York, apartment house at 161st St. and Sheridan Ave., to Grand Iron Works, N. Y.

**65 Tons,** Hempstead, N. Y., taxpayer SW corner Franklin & Orchard Sts., to Grand Iron Works, New York.

• • • **Fabricated steel inquiries** in recent weeks include the following:

**8500 Tons,** East Boston, express highway.

**1800 Tons,** Noblesville, Ind., power station for the Public Service Co. of Indiana.

**390 Tons,** Woodbridge and New Haven, Conn., two span girder bridge.

**290 Tons,** Jimtown, Calif., bridge construction, California Div. of Highways, Sacramento, bids to May 19.

**160 Tons,** Santa Barbara, Calif., Gibraltar Dam, Santa Ynez River, City Council, Santa Barbara, bids to May 6.

• • • **Reinforcing bar awards** in recent weeks include the following:

**800 Tons,** Chicago, office building for the Allstate Insurance Co., Sears Roebuck & Co. to Truscon Steel Co., Cleveland.

**350 Tons,** Cambridge, Hayden Memorial, Massachusetts Institute of Technology, for Thompson-Starrett Co.

• • • **Reinforcing bar inquiries** in recent weeks include the following:

**805 Tons,** Parker Dam, Calif., foundations for Davis Dam-Hoover Dam, Davis Dam-Prescott and Prescott-Phoenix transmission lines, Davis Dam Project, Bureau of Reclamation, Parker Dam, Calif., bids to May 25.

**600 Tons,** Saginaw, Mich., veterans' hospital through U. S. Engineers.

**500 Tons,** South Bend, Ind., Sears Roebuck Store Building.

**350 Tons,** Skokie, Ill., laboratory for Portland Cement Assn.

**240 Tons,** Jimtown, Calif., bridge construction, California Div. of Highways, Sacramento, bids to May 19.

**100 Tons,** Woodbridge and New Haven, Conn., two span welded girder bridge.

• • • **Plate awards** in recent weeks include the following:

**11,000 Tons,** Minneapolis, 48 in. city water line to Bethlehem Steel Co., Bethlehem.

• • • **Piling inquiries** in recent weeks include the following:

**260 Tons,** Woodbridge and New Haven, Conn., two span welded girder bridge.

# Tom Smith Jr. PMI Head Jumps Into Steel Industry Corner

## Fiery Leader Backs Scrap Drive Warns on Ore Shortage Pounds at John L.

By BILL LLOYD
*Cleveland Regional Editor*

*Cleveland*

• • • **Tom J. Smith, Jr.,** terrier-tempered president, Pressed Metal Institute, and an outspoken critic of steel producers, did an about face last week and found himself in the steel industry's corner.

Speaking before a meeting of Cleveland district PMI members, Mr. Smith, who was reelected president, expressed grave concern over the dwindling reserves of high grade iron ore in the Mesabi range and called for the construction of the St. Lawrence Seaway Project, urging members not to let their representatives in Congress to forget it.

He called for the return of overseas scrap, reminding members that PMI was campaigning for the return of such scrap as far back as November 1946.

He reprimanded John L. Lewis, chief, United Mine Workers, for calling a strike which has cost an estimated 1,500,000 tons of steel, and warned that "the time has apparently come to deprive such a labor leader (John L. Lewis) of the power of elevating eyebrows periodically at such tremendous cost to the public and to all industries dependent on coal for fuel.

Climax of Mr. Smith's remarks came when he stated, "In the steel industry we have discovered that the normal distribution has become highly involved and distant points of questionable utility, so that many users of this metal, particularly sheet and strip, were arbitrarily cut off from their sources of supply while the industry strove, under a multiple basing point system, to sell metal."

"The basing point system of pricing has been under fire for more than 40 years and is now in dire peril because of the current complaint of the FTC against the steel industry and through suits in anti-trust laws, particularly in the field of fixed conduit,etc. — somewhere among these actions, some alleging unfair discrimination and others adding conspiracy as well, will result inevitably a decision that may compel all producers of metals to sell f.o.b. their point of production."

Mr. Smith, who for more than 2 years has been trying to find skeletons in the steel industry's closets, promised that, "We (presumably PMI) propose to see that there is a return of sanity to the metal markets of the nation."

He said the most serious problem facing the stamping industry today is the accelerated encroachment through subsidiary organizations of a majority of metal producers into the stamping business.

Highlights of PMI meetings for the past 2 years have been the sharp exchange of words between steel company officials and Mr. Smith. Mr. Smith's last opponent was C. M. White, president, Republic Steel Corp., who minced no words in besting him in spirited debate.

Sharing the rostrum with Mr. Smith last week was DeWitt Emery, president, National Small Business Men's Assn., Chicago, who spoke on, "Who Killed Horatio Alger."

New officers of PMI elected by the board of trustees include, in addition to president Smith, vice-president, Walter A. Gorrell, president, E. J. McAleer Co., Philadelphia; secretary-treasurer, J. J. Boehm, president, Boehm Pressed Steel Co., Cleveland.

Executive committee members are: F. C. Greenhill, president, Acklin Stamping Co., Toledo; S. Morrison, executive vice-president, Morrison Steel Products, Inc., Buffalo; G. H. Roberts, president, Detroit Stamping Co., Detroit; H. S. Johnson, vice-president and general manager, the Metal Specialty Co., Cincinnati; Howard E. Wolfe, Mullins Mfg. Corp., Warren, Ohio; W. G. Jeschke, president, Res Mfg. Co., Milwaukee; and three officers ex officio.

---

## Human Relations Program

(CONTINUED FROM PAGE 123)

civic and thought leaders, plant supervisors, foremen, white collar workers and hourly paid employees. In a 90-min program each company officer described his part in the past years' operations. Projected slides accented important points and questions were answered.

Has this community relations program paid off? How does one figure the return on such an investment? How much would a 1 pct increase in productivity be worth —if it could be measured? or a wildcat strike prevented? If there were nothing else to measure its worth, company officials feel the whole program of explaining its operations, principles and ideals was repaid in full last year.

For months Alleghany Ludlum had been trying to buy from War Assets Administration the Brigham Rd. plant at Dunkirk, N. Y., which the company operated during the war. Though its bids were high they were invariably rejected by WAA. Lined up against the steel company were the mayor and the chamber of commerce of Dunkirk; they didn't want to see the company get the plant because it was already active in the community. They sought diversification, wanted it sold to some other company or industry. One day, shortly after last year's "flying circus" had hit Dunkirk the mayor and several civic leaders called on Mr. Bacheller in Pittsburgh. They had changed their minds about the Brigham Rd. plant. They wanted instead to know how they could help Allegheny Ludlum get the plant. A few weeks later WAA accepted the A-L bid of $1,475,000. The wartime cost of the plant was $4,638,000. How much is a good community relations program worth?

# MACHINE TOOLS

. . . News and Market Activities

## Builders' First Quarter Good Despite Lack of Foreign Buyers

• • • **Machine tool** builders turned in a fast first quarter despite the fact that many foreign buyers were out of the market because of lack of dollars or awaiting enactment of ERP (which proved to be very sound strategy) or both.

According to authoritative sources in the machine tool industry, new firm orders were up 20 pct over the first quarter of 1947, shipments were lower, and the undertone in major markets was strong and steady. March orders were up 10 pct over February, while shipments declined. Unfilled orders remain at approximately the same level.

This seemingly rosy picture is clouded somewhat by the fact that estimates are on the basis of dollar volume, and reflect the price increases which went into effect durnig the first quarter.

And while the opinion is by no means general, certain somber observers allege that with the business squeezed in by the price increases, the industry has reached the turning point. April business has only been fair and orders are well below March in many sectors.

Many report the drift of business downward, but gradual. A quick check in eastern markets shows conditions leading up to the current state of affairs.

A majority of the trade in the first quarter of this year received more inquiries than in the fourth quarter of 1947, while possibly a fifth of the trade had fewer, these averaging around 10 pct less.

Inquiries the first quarter of this year were far ahead of those for the first 1947 quarter, but the first quarter of 1947 saw machine tool builders sitting on the sidelines due to the market being literally plastered with government surplus tools.

In the first quarter of this year, tool builders did approximately 31½ pct more business than in the last quarter of 1947, because worth while government surplus tools had been taken off the market. But compared with first quarter of 1947, first quarter 1948 business was about 15½ pct less. In all cases there were exceptions.

### New Firm Orders Up 20 Pct Over Same Period '47; Shipments Down

In Detroit, the trend in the machine tool industry is mixed. Some pickup in the volume of standard equipment for tool rooms has been noted, although new business placements by large auto manufacturers are at a virtual standstill at the present time. Some estimates for a sizable volume of Ford business have gone out, it is indicated, but this program is reported to be definitely in the preliminary stage.

At the moment, Detroit hears many rumors of tooling programs for the armed services, but no one has yet come up with a definite order for new equipment. It is undoubtedly true that organized efforts are being made to determine the potential tooling capacity of this area in the event of a national emergency. Such a program, however, is considered by most sources to be a necessary step to be taken in peacetime. It is not to be associated logically with the current war scare.

Local tool and die shops, it is reported, have now virtually completed the Ford retooling program. A substantial volume of Chrysler die work is in the shops, it is indicated, and a scattering of Fisher Body work is also said to be in process. Much of the Fisher program, it is believed, will be performed in captive shops. Meanwhile, the usual volume of out-of-town orders helps to fill up the schedules of the Detroit die industry. At the moment backlogs are tending toward the thin side. A source for a substantial volume of desirable new business has not yet appeared, it is reported.

In the East, dealers report March orders reached a high point, but April to date has proved disappointing. Dealer volume, while high in recent months, shows a disappointing lack of diversification. Orders are concentrated in the expansion program of a relatively few firms interested principally in special purpose machines. There is no volume of standard tool business, and not any reasonable number of inquiries.

Dealers point out that the $122 million tool program of ERP is not likely to make any real impression on the industry's volume, as it represents only 33 pct of current production, which itself represents only 16 pct of industry capacity. Domestic dealers will not handle any of this equipment, but some will go through foreign dealer channels.

Builders who are stuck with big contracts with Russia, negotiated long before our present administration policy was established, having produced the tools are in a quandary as to what to do with them, as they are mostly special purpose tools which cannot be readily disposed of elsewhere. There is not much possibility of obtaining licenses for export to Russia at this time and the recommended policy of the administration to make shipment f.a.s. New York is not likely to be accepted by the customer.

There are many interpretations of f.a.s. and the experience of some exporters suggest that foreign customers often have bizarre but firm notions as to what free-alongside constitutes. Foreign buyers have, on occasion, interpreted f.a.s. to mean safe delivery aboard ship and a receipt to that effect from the captain, etc. Some of the Polish orders now held at seaboard were placed through the government purchasing agent whose responsibility it is to get the necessary this equipment will suffer no finan- export licenses, and producers of cial loss.

# SCRAP

*. . . News and Market Activities*

## Inflationary Trends Seen in Market

• • • **Reports from** all market districts confirm the underlying strength of the scrap market. While there were no price changes in openhearth grades last week, blast furnace scrap prices were advanced in two major districts.

An immediate inflationary influence on the market is seen in the new freight rate increases soon to go into effect throughout most of the country. At first dealers will be required to absorb the freight cost increases, but there is no doubt that in today's market the burden will soon be shifted to the mills.

More important inflationary effects lie in the steel requirements for the European Recovery Program and for rearmament. Reports indicate that mills, conscious of the early prospect for the establishment of controls over raw materials, are urging brokers to get in the scrap called for by existent orders. At present, formula prices are holding fast throughout the country, but there are growing indications of purchases by some consumers in small lots at higher prices, and the raiding of out of district markets. There are also reports of the shipment of openhearth grades identified as nonformula grades at the higher prices carried by those grades.

The movement of scrap to consumers is in very heavy volume, but mills are still compensating for low blast furnace operation by higher proportions of scrap in the openhearth charge. Despite the volume of scrap shipments, mill inventories are not growing. As yet, there has been no evidence of a decline in scrap production resulting from curtailed deliveries of steel after the coal strike. This may be expected to reduce the volume of shipments in the next month or two, but by that time observers anticipate that blast furnace production will have reached a point where hot metal tonnage will compensate for the scrap shortage.

•

PITTSBURGH—On most grades the market has been coasting. Mills here report they are laying down tonnages of steelmaking scrap. Efforts to knock up to a dollar off openhearth prices have been made without success. Railroad specialties were 50¢ stronger. Cast iron scrap has been getting harder to deliver because foundries are running out of storage space for it. With shortages of pig iron and coke some have tried increasing cast scrap charges but this has reached a limit because of difficulty in getting carbon content up. Despite this there is no evidence of price weakness, perhaps because of knowledge that within a few weeks demand will again top supply by a big margin. The May 1 increases will put freight from New England here at over $10.20 a gross ton; the freight from New York City will top $9.50 a ton.

•

CHICAGO—Scrap buyers for the mills are fighting to maintain formula prices in the face of a very strong market. The largest single buyer in the area spent several days last week cajoling, threatening and otherwise throwing their weight around about brokers paying high prices to cover the $39.50 orders. It appears even now that if a broker can sew up enough tonnage in advance some mills will pay a premium, but it has to be good scrap, the broker must have it, and it must be kept quiet. Foundries are resisting any further advantage in cast prices. Lack of coke, pig iron, and in some cases orders, has made this attitude imperative.

•

PHILADELPHIA—The scrap market was firm here last week and there were no price changes except an increase of $3 in malleable. Scrap is moving freely to mills, but consumption is going on at a high rate. Most factors here expect the market to stay at formula prices in the next few weeks despite the reports of high springboards that have been reported from some districts. How scrap will move pricewise depends on the balance between declining scrap shipments growing out of the drop in steel shipments due to the coal strike and the speed with which raw steel production picks up.

•

BUFFALO—An upturn in the steel rate, coupled with sales to nearby consumers of shoveling turnings at the equivalent of $36 Buffalo, up $1 over the previous bid, and of machine shop turnings at approximately $35, or 25¢ over the formula, strengthened the market last week. Openhearth grades were firm at the "ceiling" and dealers were cautious about making extensive commitments, due to a falling off in receipts. Most of the scrap coming out was reported to consist of lighter materials, such as sheets. Demand for foundry specialties remained slow with two of the leading consumers out of the market.

•

CLEVELAND—All grades are in strong demand and brokers are trying to buy on the basis of formula prices. Host consumers are getting shipments about equal to consumption and little more, and with blast furnace capacity in the area still idle from the coal strike, consumers are pushing the brokers for shipments. Foundry grades are strong, especially cast. With the resumption of capacity blast furnace operations, one of the major consumers in this area hopes to be able to get out of the market within a week or two.

•

DETROIT—The scrap market in Detroit presents a mixed situation this week although informed observers agree that most of the important factors are leaning toward the weak side. Scrap shipments have picked up noticeably according to most brokers and dealers and the announcement of a steel price cut is not expected to add to the buoyancy of existing scrap prices. Cast grades, low phos and foundry steel are definitely on the weak side. Meanwhile, scattered reports of over-the-formula sales continue to be heard. The price of cast iron scrap is off $2 in Detroit this week.

•

CINCINNATI—Openhearth and blast furnace material is in strong demand and there is a strong suspicion on the part of some of the dealers and brokers that the market is going to strengthen, pricewise, and there is some inclination to hold material back, according to reports. Some of the recent trading would seem to indicate that the formula is rapidly becoming a thing of the past and that prices are on the way up. Foundry grades are a little slow at the moment, due primarily to the shortage of coke, but evidence of a stronger market for these grades is at hand. There have been reports of Pittsburgh consumers buying in this market for the past week at prices $2 to $3 over formula.

•

NEW YORK—The market continued strong but prices were unchanged here last week. Scrap is moving to mills in large volume but there is no indication that mill reserves are growing. There are reports of prices having been paid above formula in some instances but upon investigation it turns out that small lots are involved and grades not covered by formula. Dealers are willing to sell freely at formula prices.

•

BIRMINGHAM — Steady demand and firm prices mark the scrap market here. Consumers have been able to build up inventories as a result of the coal mine strike reducing operation rates, but purchases have not fallen off noticeably. Peddler activity is reported high.

•

BOSTON—A spotty condition still exists in the scrap market. A few brokers are doing a fair business, but most of them are doing little. Prices of cast appear to have settled down.

•

TORONTO — Fresh offerings of scrap iron and steel are appearing at local distributing centers in better volume from outside points, but overall tonnage is not meeting 50 per cent of total domestic requirements. Mills are still carrying on with supplies imported last year, while foundries, in most instances have little or no scrap available.

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

## PITTSBURGH

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $40.00 to $40.50 |
| RR. hvy. melting | 41.00 to 41.50 |
| No. 2 hvy. melting | 40.00 to 40.50 |
| RR. scrap rails | 55.50 to 56.50 |
| Rails 2 ft and under | 62.50 to 63.50 |
| No. 1 comp'd bundles | 40.00 to 40.50 |
| Hand bdld. new shts | 40.00 to 40.50 |
| Hvy. axle turn. | 41.50 to 42.00 |
| Hvy. steel forge turn | 41.50 to 42.00 |
| Mach. shop turn | 35.50 to 36.00 |
| Shoveling turn. | 38.50 to 39.00 |
| Mixed bor. and turn | 35.50 to 36.00 |
| Cast iron boring | 38.00 to 38.50 |
| No. 1 cupola cast. | 63.00 to 65.00 |
| Hvy. breakable cast | 52.50 to 53.50 |
| Malleable | 77.00 to 79.00 |
| RR. knuck, and coup. | 54.50 to 55.50 |
| RR. coil springs | 54.50 to 55.50 |
| RR. leaf springs | 54.50 to 55.50 |
| Rolled steel wheels | 54.50 to 55.50 |
| Low phos. | 47.00 to 47.50 |

## CHICAGO

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $39.00 to $39.50 |
| No. 2 hvy. melting | 39.00 to 39.50 |
| No. 1 bundles | 39.00 to 39.50 |
| No. 2 dealers' bundles | 39.00 to 39.50 |
| Bundled mach. shop turn. | 37.00 to 37.50 |
| Galv. bundles | 35.00 to 35.50 |
| Mach. shop turn. | 34.00 to 34.50 |
| Short shov. turn. | 35.50 to 36.50 |
| Cast iron borings | 35.50 to 36.50 |
| Mix. borings & turn. | 34.00 to 34.50 |
| Low phos. hvy. forge | 44.00 to 48.00 |
| Low phos. plates | 42.50 to 45.00 |
| No. 1 RR. hvy. melt. | 41.75 to 43.50 |
| Rerolling rails | 52.00 to 54.00 |
| Miscellaneous rails | 50.00 to 52.00 |
| Angles & splice bars | 52.00 to 53.00 |
| Locomotive tires, cut | 54.00 to 55.00 |
| Cut bolster & side frames | 49.00 to 51.00 |
| Standard stl. car axles | 58.00 to 59.00 |
| No. 3 steel wheels | 51.00 to 52.00 |
| Couplers & knuckles | 51.00 to 52.00 |
| Rails, 2 ft and under | 55.00 to 57.00 |
| Malleable | 76.00 to 78.00 |
| No. 1 mach. cast | 73.00 to 75.00 |
| No. 1 agricul. cast. | 61.00 to 65.00 |
| Heavy breakable cast. | 51.00 to 52.00 |
| RR. grate bars | 59.00 to 61.00 |
| Cast iron brake shoes | 58.00 to 60.00 |
| Cast iron carwheels | 58.00 to 60.00 |

## CINCINNATI

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $38.50 to $39.50 |
| No. 2 hvy. melting | 38.50 to 39.50 |
| No. 1 bundles | 38.50 to 39.50 |
| No. 2 bundles | 38.50 to 39.50 |
| Mach. shop turn. | 33.00 to 33.50 |
| Shoveling turn. | 35.00 to 35.50 |
| Cast iron borings | 32.50 to 33.00 |
| Mixed bor. & turn. | 32.50 to 33.00 |
| Low phos., plate | 46.00 to 48.00 |
| No. 1 cupola cast | 63.00 to 64.00 |
| Hvy. breakable cast. | 53.00 to 54.00 |
| Rails 18 in. & under | 60.00 to 61.00 |
| Rails random length | 51.00 to 52.00 |
| Drop broken | 66.00 to 68.00 |

## BOSTON

**Dealers' buying prices, per gross ton, f.o.b. Boston**

| | |
|---|---|
| No. 1 hvy. melting | $31.65 to $31.90 |
| No. 2 hvy. melting | 31.65 to 31.90 |
| Nos. 1 and 2 bundles | 31.65 to 31.90 |
| Busheling | 31.65 to 31.90 |
| Shoveling turn. | .... 28.90 |
| Machine shop trun. | .... 26.90 |
| Mixed bor. & turn. | .... 26.90 |
| Cl'n cast chem. bor. | 38.00 to 40.00 |
| No. 1 machinery cast. | 56.00 to 60.00 |
| No. 2 machinery cast. | 55.00 to 60.00 |
| Heavy breakable cast. | 50.00 to 52.00 |
| Stove plate | 53.00 to 55.00 |

## DETROIT

**Per gross ton, brokers' buying prices f.o.b. cars:**

| | |
|---|---|
| No. 1 hvy. melting | .... $35.50 |
| No. 2 hvy. melting | .... 35.50 |
| No. 1 bundles | .... 35.50 |
| New busheling | .... 35.50 |
| Flashings | .... 35.50 |
| Mach. shop turn. | $29.00 to 29.50 |
| Shoveling turn. | 30.00 to 30.50 |
| Cast iron borings | 30.00 to 30.50 |
| Mixed bor. & turn. | 28.50 to 29.00 |
| Low phos. plate | 39.50 to 40.50 |
| No. 1 cupola cast. | 57.00 to 60.00 |
| Heavy breakable cast. | 50.00 to 55.00 |
| Stove plate | 50.00 to 54.00 |
| Automotive cast. | 57.00 to 62.00 |

## PHILADELPHIA

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $41.00 to $42.00 |
| No. 2 hvy. melting | 38.00 to 39.00 |
| No. 1 bundles | 41.00 to 42.00 |
| No. 2 bundles | 38.00 to 39.00 |
| Mach. shop turn. | 33.50 to 34.50 |
| Shoveling turn. | 33.50 to 34.50 |
| Mixed bor. & turn. | 33.50 to 34.50 |
| Clean cast chemical bor. | 42.00 to 44.00 |
| No. 1 machinery cast. | 65.00 to 66.00 |
| No. 1 mixed yard cast. | 62.00 to 63.00 |
| Hvy. breakable cast. | 61.00 to 62.00 |
| Clean auto cast. | 62.00 to 63.00 |
| Hvy. axle forge turn. | 43.00 to 44.00 |
| Low phos. plate | 47.00 to 48.00 |
| Low phos. punchings | 47.00 to 48.00 |
| Low phos. bundles | 45.00 to 46.00 |
| RR. steel wheels | 52.00 to 53.00 |
| RR. coil springs | 52.00 to 53.00 |
| RR. malleable | 75.00 to 78.00 |
| Cast iron carwheels | 68.00 to 70.00 |

## ST. LOUIS

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $41.00 to $42.00 |
| No. 2 hvy. melting | 37.50 to 38.50 |
| Bundled sheets | 37.50 to 38.50 |
| Mach. shop turn. | 33.00 to 33.50 |
| Locomotive tires, uncut | 46.00 to 47.00 |
| Mis. std. sec. rails | 46.50 to 47.50 |
| Steel angle bars | 53.00 to 54.00 |
| Rails 3 ft and under | 53.00 to 55.00 |
| R.R. steel springs | 48.50 to 49.50 |
| Steel car axles | 51.00 to 52.00 |
| Grate bars | 60.00 to 62.00 |
| Brake shoes | 58.00 to 60.00 |
| Malleable | 71.00 to 72.00 |
| Cast iron car wheels | 61.00 to 62.00 |
| No. 1 machinery cast | 65.00 to 67.00 |
| Hvy. breakable cast | 59.00 to 60.00 |

## BIRMINGHAM

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $37.50 to $38.50 |
| No. 2 hvy. melting | 37.50 to 38.50 |
| No. 2 bundles | 37.50 to 38.50 |
| No. 1 busheling | 37.50 to 38.50 |
| Long turnings | 25.00 to 26.00 |
| Shoveling turnings | 27.00 to 28.00 |
| Cast iron borings | 26.00 to 27.00 |
| Bar crops and plate | 42.50 to 43.50 |
| Structural and plate | 42.50 to 43.50 |
| No. 1 cupola cast. | 60.00 to 65.00 |
| Stove plate | 55.00 to 58.00 |
| No. 1 RR. hvy. melt. | 37.50 to 38.50 |
| Steel axles | 38.00 to 39.00 |
| Scrap rails | 44.00 to 45.00 |
| Rerolling rails | 52.00 to 54.00 |
| Angles & splice bars | 47.50 to 50.00 |
| Rails 3 ft & under | 52.00 to 56.00 |
| Cast iron carwheels | 48.00 to 50.00 |

## YOUNGSTOWN

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $40.00 to $40.50 |
| No. 2 hvy. melting | 40.00 to 40.50 |
| Mach. shop turn. | 35.00 to 35.50 |
| Short shov. turn. | 37.00 to 37.50 |
| Cast iron borings | 36.00 to 36.50 |
| Low phos. | 45.00 to 45.50 |

## NEW YORK

**Brokers' buying prices per gross ton, on cars:**

| | |
|---|---|
| No. 1 hvy. melting | .... $34.50 |
| No. 2 hvy. melting | .... 34.50 |
| No. 2 bundles | .... 34.50 |
| Mach. shop turn. | $29.00 to 29.50 |
| Mixed bor. & turn. | 29.00 to 29.50 |
| Shoveling turn. | 31.00 to 32.00 |
| No. 1 cupola cast. | 55.00 to 56.00 |
| Clean auto cast. | 55.00 to 56.00 |
| Hvy. breakable cast. | 54.00 to 55.00 |
| Charging box cast. | 54.00 to 55.00 |
| Unstrp. motor blks. | 51.00 to 52.00 |
| Cl'n cast chem. bor. | 34.50 to 35.50 |

## BUFFALO

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $39.75 to $40.00 |
| No. 2 hvy. melting | .... 39.75 |
| No. 1 bundles | .... 39.75 |
| No. 2 bundles | .... 39.75 |
| No. 1 busheling | .... 39.75 |
| Mach. shop turn. | 34.75 to 35.00 |
| Shoveling turn. | 35.00 to 36.00 |
| Cast iron borings | .... 35.75 |
| Mixed bor. & turn. | .... 34.75 |
| Mixed cupola cast. | 60.00 to 62.00 |
| Charging box cast. | 54.00 to 55.00 |
| Stove plate | 58.00 to 60.00 |
| Clean auto cast. | 60.00 to 62.00 |
| RR. malleable | 70.00 to 75.00 |
| Small indl. malleable | 47.00 to 49.00 |
| Low phos. plate | 44.75 to 46.00 |
| Scrap rails | 50.00 to 52.00 |
| Rails 3 ft & under | 57.00 to 58.00 |
| RR. steel wheels | 51.00 to 52.00 |
| Cast iron carwheels | 51.00 to 52.00 |
| RR. coil & leaf spgs. | 51.00 to 52.00 |
| RR. knuckles & coup. | 51.00 to 52.00 |

## CLEVELAND

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 hvy. melting | $39.50 to $40.00 |
| No. 2 hvy. melting | 39.50 to 40.00 |
| No. 1 bundles | 39.50 to 40.00 |
| No. 1 busheling | 39.50 to 40.00 |
| Drop forge flashings | 39.50 to 40.00 |
| Mach. shop turn. | 34.50 to 35.00 |
| Shoveling turn. | 35.50 to 36.00 |
| Steel axle turn. | 39.50 to 40.00 |
| Cast iron borings | 35.50 to 36.00 |
| Mixed bor. & turn. | 35.50 to 36.00 |
| Low phos. | 44.50 to 45.00 |
| No. 1 machinery cast. | 65.00 to 70.00 |
| Malleable | 75.00 to 77.00 |
| RR. cast. | 70.00 to 73.00 |
| Railroad grate bars | 60.00 to 62.00 |
| Stove plate | 60.00 to 62.00 |
| RR. hvy. melting | 40.00 to 40.50 |
| Rails 3 ft & under | 60.00 to 61.00 |
| Rails 18 in. & under | 61.00 to 62.00 |

## SAN FRANCISCO

**Per gross ton f.o.b. shipping point:**

| | |
|---|---|
| No. 1 hvy. melting | .... $25.00 |
| No. 2 hvy. melting | .... 25.00 |
| No. 2 bales | .... 25.00 |

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 3 bales | .... $19.50 |
| Mach. shop turn. | .... 16.00 |
| Elec. furn. 1 ft under | $32.00 to 34.00 |
| No. 1 cupola cast. | .... 40.00 |
| RR. hvy. melting | .... 26.00 |

## LOS ANGELES

**Per gross ton f.o.b. shipping point:**

| | |
|---|---|
| No. 1 hvy. melting | .... $25.00 |
| No. 2 hvy. melting | .... 25.00 |
| No. 1 bales | .... 25.50 |
| No. 2 bales | .... 25.00 |
| No. 3 bales | .... 19.00 |
| Mach. shop turn. | .... 17.50 |
| No. 1 cupola cast. | $40.00 to 43.00 |
| RR. hvy. melting | .... 26.00 |

## SEATTLE

**Per gross ton delivered to consumer:**

| | |
|---|---|
| No. 1 & No. 2 hvy. melt. | .... $26.00 |
| Elec. furn. 1 ft and under | .... 30.00 |
| No. 1 cupola cast. | .... 40.00 |
| RR. hvy. melting | .... 28.00 |

## HAMILTON, ONT.

**Per gross ton delivered to consumer: Cast grades f.o.b. shipping point.**

| | |
|---|---|
| Heavy melting | $22.00* |
| No. 1 bundles | 22.00* |
| No. 2 bundles | 21.50* |
| Mechanical bundles | 20.00* |
| Mixed steel scrap | 19.00* |
| Mixed borings and turnings | 17.00* |
| Rails, remelting | 23.00* |
| Rails, rerolling | 26.00* |
| Bushelings | 17.00* |
| Bushelings, new fact, prep'd | 21.00* |
| Bushelings, new fact, unprep'd | 16.00* |
| Short steel turnings | 17.00* |
| No. 1 cast | $42.00 to 46.00 |
| No. 2 cast | 35.00 to 37.00 |

*Ceiling Price.

# NONFERROUS METALS

*. . . News and Market Activities*

## Producers Disagree on Distribution Methods For Scarce Metals

*New York*

• • • **Controversy rages** in nonferrous metals production circles as to the most desirable methods for distributing available supplies of metals, most of which are in short supply for current civilian demand, under the impact of the added requirements for the European Recovery Program and the domestic rearmament program. Until recently, industry members had little tangible information on what the actual requirements of the ERP would mean for each metal on a tonnage basis. They are still in the dark as to the scope of the requirements for the rearmament program.

Last week Paul Hoffman announced the Economic Cooperation Administration's program of shipments over the next 15 months. The costs of procurement shown for each metal below were based on July 1, 1947 prices which have advanced in the case of lead by $50 a ton, in zinc by $32.20 a ton, in tin by $313.60 a long ton. The copper and aluminum prices are unchanged. Tonnage figures are in short tons.

The United States will export 80,000 tons of copper in the 15 month period, at a cost of $30.7 million. Canada will ship 82,000 tons, at a cost of $31.7 million. Other Western Hemisphere countries will ship 247,000 tons at a cost of $119 million. Refined copper production in the United States is exceeding 90,000 tons per month and in a number of recent months has exceeded 100,000 tons.

The United States will export 30,000 tons of lead at $7.4 million at July 1 prices, Canada will export 70,000 tons, and other Western Hemisphere countries, 216,000 tons. United States production of refined lead averages 50,000 tons a month.

The United States will export 60,000 tons of zinc, which would have cost $13.2 million at July 1 prices. Canada will export 97,000 tons, and the other Western Hemisphere nations, 162,000 tons. United States production of slab zinc has been exceeding 70,000 tons a month.

United States exports of aluminum will be 230,000 tons, with no metal coming from Canada or other Western Hemisphere nations under the program. U. S. production of aluminum has been averaging 45,000 tons per month recently.

No tin will be exported from the United States, but Canada will ship 22,500 metric tons to the United Kingdom under the program. Other Western Hemisphere nations will ship 5000 tons to U. K. dependencies.

*The significance* of the tonnages involved in this program does not revolve around the shipments from the United States which are comparatively small, but in the tonnages to be shipped from other Western Hemisphere nations which are, in the cases of copper, lead and zinc, important producing areas for our needs. At a time when domestic consumers are desperately in need of more metals than they are able to obtain, these tonnages well might be the straw to break the camel's back. In consideration of the fact that the requirements of these metals for the rearmament program are as yet undefined, but are expected by all members of the metals industries to be appreciable, there is a great deal of study being given to the problem of servicing all these demands in the light of the current shortage of supplies.

Until recently there was unanimous disinclination to believe there was any necessity for the imposition of any form of allocation or price control. Even now, some rugged individualists in the industry resist any thought of the need for government controls, preferring to see natural control by means of the law of supply and demand. As the price of the metals are forced up by worldwide demand, new operations will come into production and marginal uses of a metal will turn to substitutes. These men see no objection to copper reaching 50¢ a lb, and lead 40¢.

However, others concede that it may be necessary for the reimposition of allocations and price controls by the government in order to assure the orderly distribution of the metals to the more essential applications covered by the two programs.

Most metal producers are unwilling to see prices rise above the present high levels. They recognize that higher profits to them would serve to encourage higher wage demands and build up the possibility of government intervention in establishing firm price controls. Looking well into the future, moreover, they foresee the probability of the permanent loss to substitute materials of some markets for which they have fought hard in the past.

At the same time the industry recognizes the overwhelming pressure of much greater world effective demand for metals under the impetus of the two programs. There is no doubt that it is necessary to revise all previous conceptions of appropriate price levels for nonferrous metals. As members of the industry put it, metals prices will be on a much higher plane for a long time in the future.

### Nonferrous Metals Prices

| | Apr. 21 | Apr. 22 | Apr. 23 | Apr. 24 | Apr. 26 | Apr. 27 |
|---|---|---|---|---|---|---|
| Copper, electro, Conn. | 21.50 | 21.50 | 21.50 | 21.50 | 21.50 | 21.50 |
| Copper, Lake, Conn. | 21.625 | 21.625 | 21.625 | 21.625 | 21.625 | 21.625 |
| Tin, Straits, New York | 94.00 | 94.00 | 94.00 | 94.00 | 94.00 | 94.00 |
| Zinc, East St. Louis | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| Lead, St. Louis | 17.30 | 17.30 | 17.30 | 17.30 | 17.30 | 17.30 |

## Primary Metals

*(Cents per lb. unless otherwise noted)*

| | |
|---|---|
| Aluminum, 99+%, 10,000 lb, f.o.b shipping point, freight allowed | 15.00 |
| Aluminum pig, f.o.b. shipping point | 14.00 |
| Antimony, American, Laredo, Tex. | 33.00 |
| Beryllium copper, 3.75-4.25% Be dollars per lb contained Be | $20.50 |
| Beryllium aluminum 5% Be, dollars per lb contained Be | $40.00 |
| Cadmium, del'd | $1.75 |
| Cobalt, 97-99% (per lb) | $1.65 to $1.72 |
| Copper electro, Conn. Valley | 21.50 |
| Copper, lake, Conn. Valley | 21.625 |
| Gold, U. S. Treas., dollars per oz. | $35.00 |
| Indium, 99.8%, dollars per troy oz. | $2.25 |
| Iridium, dollars per troy oz. | $105 to $115 |
| Lead, St. Louis | 17.30 |
| Lead, New York | 17.50 |
| Magnesium, 99.8+%, f.o.b. Freeport, Tex. | 20.50 |
| Magnesium, sticks, carlots | 34.50 |
| Mercury, dollars per 76-lb flask, f.o.b. New York | $76.50 to $77 |
| Nickel, electro, f.o.b. New York | 36.56 |
| Palladium, dollars per troy oz. | $24.00 |
| Platinum, dollars per troy oz. | $98 to $101 |
| Silver, New York, cents per oz. | 74.625 |
| Tin, Grade A, New York | 94.00 |
| Zinc, East St. Louis | 12.00 |
| Zinc, New York | 12.61 |
| Zirconium copper, 6 pct Zr, per lb contained Zr | $8.75 |

## Remelted Metals

### Brass Ingot

*(Cents per lb, in carloads)*

| | |
|---|---|
| 85-5-5-5 ingot | |
| No. 115 | 19.25–19.50 |
| No. 120 | 18.75–19.00 |
| No. 123 | 18.25–18.50 |
| 80-10-10 ingot | |
| No. 305 | 24.25 |
| No. 315 | 21.75 |
| 88-10-2 ingot | |
| No. 210 | 30.00 |
| No. 215 | 28.00 |
| No. 245 | 22.25–22.75 |
| Yellow ingot | |
| No. 405 | 15.25–16.00 |
| Manganese bronze | |
| No. 421 | 18.00 |

### Aluminum Ingot

*(Cents per lb, lots of 30,000 lb)*

| | |
|---|---|
| 95-5 aluminum-silicon alloys | |
| 0.30 copper, max. | 19.00–19.25 |
| 0.60 copper, max. | 18.75–19.00 |
| Piston alloys (No. 122 type) | 17.75–18.00 |
| No. 12 alum. (No. 2 grade) | 17.25–17.50 |
| 108 alloy | 17.25–17.75 |
| 195 alloy | 17.50–18.00 |
| AXS-679 | 17.25–17.75 |
| Steel deoxidizing aluminum, notch-bar granulated or shot | |
| Grade 1—95 pct-95½ pct | 17.25–17.75 |
| Grade 2—92 pct-95 pct | 16.75–17.00 |
| Grade 3—90 pct-92 pct | 16.25–16.75 |
| Grade 4—85 pct-90 pct | 15.75–16.25 |

## Electroplating Supplies

### *Anodes*

*(Cents per lb, f.o.b. shipping point in 500 lb lots)*

| | |
|---|---|
| Copper, frt. allowed | |
| Cast, oval, 15 in. or longer | 37⅝ |
| Electrodeposited | 32⅜ |
| Rolled, oval, straight, delivered | 33.09 |
| Brass, 80-20, frt. allowed | |
| Cast, oval, 15 in. or longer | 33⅜ |
| Zinc, cast, 99.99 | 20.50 |
| Nickel 99 pct plus, frt. allowed | |
| Cast | 51 |
| Rolled, depolarized | 52 |
| Silver 999 fine | |
| Rolled, 1000 oz lots per troy oz. | 67¼ |

### *Chemicals*

*(Cents per lb, f.o.b. shipping point)*

| | |
|---|---|
| Copper cyanide, 100 lb drum | 43.00 |
| Copper sulfate, 99.5, crystals, bbls. | 11.50 |
| Nickel salts, single, 425 lb bbls. frt. allowed | 14.50 |
| Silver cyanide, 100 oz. lots, per oz. | 54.00 |
| Sodium cyanide, 96 pct domestic, 100 lb drums | 15.00 |
| Zinc cyanide, 100 lb drums | 34.00 |
| Zinc sulfate, 89 pct, granules, bbls, frt. allowed | 7.75 |

## Mill Products

### Aluminum

*(Base prices, cents per pound, base 30,000 lb., f.o.b. shipping point, freight allowed.)*

**Flat Sheet:** 0.188 in., 2S, 3S, 24¢; 4S, 61S-O, 25.8¢; 52S, 27.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢. 0.081 in.; 2S, 3S, 25¢; 4S, 61S-O, 27.1¢; 52S, 29¢; 24S-O, 24S-OAL, 27.7¢; 75S-O, 75S-OAL, 34.3¢. 0.032 in.; 2S, 3S, 26.4¢; 4S, 61S-O, 30.1¢; 52S, 32.6¢; 24S-O, 24S-OAL, 34.2¢; 75S-O, 75S-OAL, 43.1¢.

**Plate:** ¼ in. and heavier; 2S, 3S, 21.2¢; 4S-F, 23.2¢; 52S, 24.2¢; 61S-O, 23.8¢; 24S-F,24S-FAL, 24.2¢; 75S, 75S-AL, 30.5¢.

**Extruded Solid Shapes:** Shape factors 1 to 4; 31¢ to 59¢; 11 to 13, 31.9¢ to 69¢; 23 to 25, 33.4c to 90¢; 35 to 37, 40.8¢ to $1.25; 47 to 49, 58.7¢ to $1.84.

**Extruded Round Rod, Square, Hex, Octagonal Bar:** ¼ in. and over, 27¢ to 38¢; ½ to ¾ in., 28¢ to 40.5¢; ⅜ to ½ in., 29c to 43c; ¼ to ⅜ in., 30¢ to 46.5¢; ⅞ to 1⅜ in., 32.5¢ to 53.5¢; 9/64 to ⅜ in., 35.5¢ to 62¢.

**Rolled Rod:** 1.064 to 4.5 in., 2S, 3S, 30¢ to 26.5¢; Cold-finished rod, 0.375 to 3.5 in., 2S, 3S, 32¢ to 28¢.

**Screw Machine Stock:** Drawn, 1/32 to ⅛ in., 11S-T3, 34¢ to 45¢; cold-finished, ⅝ to 1½ in., 11S-T3, 33¢ to 31¢; rolled, 1⅞ to 3 in., 11S-T3, 31¢ to 28.5¢.

**Drawn Wire:** coiled, 0.051 to 0.374 in.; 2S, 33¢ to 24¢ 52S, 40.5c to 29c; 56S, 42.5¢ to 34.5¢; 17S-T4, 46¢ to 31¢; 61S-T4, 41c to 30.5c; 75S-T6, 66¢ to 46¢.

### Magnesium

*(Cents per lb, f.o.b. mill, freight allowed. Base quantity 30,000 lb.)*

**Sheet and Plate:** Ma. FSa. ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58c-60c; 10, 59c-61c; 12, 63-65c; 14, 69c-74c; 16, 76c-81c; 18, 84c-89c 20, 96c-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

**Round Rod:** M, diam., in., ¼ to ⅝, 47¢; ½ to ¾, 45¢; 1¼ to 2½, 43.5¢; 3½ to 5, 42.5¢. Other alloys higher.

**Square, Hexagonal Bar:** M, size across flats, in., ¼ to ⅜, 52.5¢; ½ to ¾, 47.5¢; 1¼ to 2½, 45¢; 3½ to 5, 44¢. Other alloys higher.

**Solid Shapes, Rectangles:** M, form factors, 1 to 4, 46¢; 11 to 13, 49¢; 20 to 22, 51.5¢; 29 to 31, 59.5¢; 38 to 40, 75.5¢; 47 to 49, 98¢. Other alloys higher.

**Round Tubing:** M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to ⅝, $1.21; ⅝ to ⅞, $1.12; ⅞ to 1⅛, 97¢; 0.058 to 0.064, 1⅛ to 1½, 89¢; ½ to 5½, 81¢; 0.065 to 0.082, ⅝ to ¾, 76¢; ¾ to 1, 72¢; 0.083 to 0.108, 1 to 2, 68¢; 0.165 to 0.219, 2 to 3, 59¢; 3 to 4, 57¢. Other alloys higher.

### Nickel and Monel

*(Cents per lb, f.o.b. mill)*

| | Nickel | Monel |
|---|---|---|
| Sheets, cold-rolled | 54 | 43 |
| No. 35 sheets | | 41 |
| Strip, cold-rolled | 60 | 44 |
| Rod | | |
| Hot-rolled | 50 | 39 |
| Cold-drawn | 55 | 44 |
| Angles, hot-rolled | 50 | 39 |
| Plates | 52 | 41 |
| Seamless tubes | 83 | 71 |
| Shot and blocks | | 31 |

### Copper, Brass, Bronze

*(Cents per pound, freight prepaid on 200 lb)*

| | Extruded Shapes | Rods | Sheets |
|---|---|---|---|
| Copper | 33.53 | .... | 33.68 |
| Copper, hot-rolled | .... | 30.03 | .... |
| Copper, drawn | .... | 31.03 | .... |
| Low brass | 34.36* | 31.39 | 31.70 |
| Yellow brass | 32.92* | 29.85 | 30.16 |
| Red brass | 34.89* | 31.92 | 32.23 |
| Naval brass | 30.28 | 29.03 | 34.97 |
| Leaded brass | 28.64 | 24.69 | .... |
| Commercial bronze | 35.68* | 32.96 | 33.27 |
| Manganese bronze | 33.87 | 32.37 | 38.47 |
| Phosphor bronze, 5 pct | 53.95* | 52.95 | 52.70 |
| Muntz metal | 29.80 | 28.55 | 32.99 |
| Everdur, Herculoy, Olympic, etc. | 37.24 | 37.50 | 38.56 |
| Nickel silver, 10 pct | 41.80 | 42.68 | 40.54 |
| 5 pct | .... | .... | 38.98 |
| Architectural bronze | 28.61 | .... | .... |

*Seamless tubing.

## Scrap Metals

### Brass Mill Scrap

*(Cents per pound; add 1¢ per lb for shipments of 15,000 lb or more.)*

| | Heavy | Turnings |
|---|---|---|
| Copper | 19⅛ | 18⅜ |
| Yellow brass | 15⅝ | 14⅝ |
| Red brass | 17½ | 16⅝ |
| Commercial bronze | 17⅝ | 16⅞ |
| Manganese bronze | 15¼ | 14⅝ |
| Leaded brass rod ends | 15¾ | .... |

### Custom Smelters' Scrap

*(Cents per pound, carload lots, delivered to refinery.)*

| | |
|---|---|
| No. 1 copper, wire | 18.75–19.00 |
| No. 2 copper, wire | 17.75–18.00 |
| Light copper | 16.75–17.75 |
| Refinery brass | 16.50–16.75* |

*Dry copper content.

### Ingot Makers' Scrap

*(Cents per pound, carload lots, delivered to producer.)*

| | |
|---|---|
| No. 1 copper, wire | 18.25 |
| No. 2 copper, wire | 17.25 |
| Light copper | 16.25 |
| No. 1 composition | 15.25 |
| No. 1 comp. turnings | 14.75 |
| Rolled brass | 11.50 |
| Brass pipe | 12.00 |
| Radiators | 12.00 |
| Heavy yellow brass | 11.25 |
| *Aluminum* | |
| Mixed old cast | 10.00 |
| Mixed old clips | 9.50 |
| Mixed turnings | 5.50 |
| Pots & pans | 10.25 |
| Low copper | 10.50–10.75 |

### Dealers' Scrap

*(Dealers' buying prices, f.o.b. New York in cents per pound.)*

#### Copper and Brass

| | |
|---|---|
| No. 1 heavy copper and wire | 16½—17 |
| No. 2 heavy copper and wire | 15½—16 |
| Light copper | 14¼—14⅝ |
| Auto radiators (unsweated) | 10 —10½ |
| No. 1 composition | 12¾—13¼ |
| No. 1 composition turnings | 12¼—12⅝ |
| Clean red car boxes | 9¾—10¼ |
| Cocks and Faucets | 10 —10½ |
| Mixed heavy yellow brass | 8 — 8½ |
| Old rolled brass | 9½—10 |
| Brass pipe | 10 —10½ |
| New soft brass clippings | 12¼—12⅝ |
| Brass rod ends | 10 —10½ |
| No. 1 brass rod turnings | 9½—10 |

#### Aluminum

| | |
|---|---|
| Alum. pistons with struts | 4½— 5 |
| Aluminum crankcases | 7½— 8 |
| 2S aluminum clippings | 9 — 9½ |
| Old sheet & utensils | 7½— 8 |
| Dry borings and turnings | 3 — 3½ |
| Misc. cast aluminum | 7½— 8 |
| Dural clips (24S) | 7½— 8 |

#### Zinc

| | |
|---|---|
| New zinc clippings | 8 — 8½ |
| Old zinc | 5½— 5⅝ |
| Zinc routings | 3 — 3½ |
| Old die cast scrap | 4 — 4½ |

#### Nickel and Monel

| | |
|---|---|
| Pure nickel clippings | 16 —17 |
| Clean nickel turnings | 12½—13 |
| Nickel anodes | 16 —17 |
| Nickel rod ends | 16 —17 |
| New Monel clippings | 12 —13 |
| Clean Monel turnings | 7 — 8 |
| Old sheet Monel | 10 —10½ |
| Old Monel castings | 7½— 8 |
| Inconel clippings | 8 — 8½ |
| Nickel silver clippings, mixed | 8 — 8½ |
| Nickel silver turnings, mixed | 6½— 7 |

#### Lead

| | |
|---|---|
| Soft scrap lead | 14½—15 |
| Battery plates (dry) | 8¾— 9 |

#### Magnesium Alloys

| | |
|---|---|
| Segregated solids | 7½— 8 |
| Castings | 4½— 5½ |

#### Miscellaneous

| | |
|---|---|
| Block tin | 75 —77 |
| No. 1 pewter | 60 —62 |
| No. 1 auto babbitt | 45 —47 |
| Mixed common babbitt | 14¼—14⅝ |
| Solder joints | 17¼—17⅝ |
| Siphon tops | 45 —47 |
| Small foundry type | 17½—18 |
| Monotype | 16¼—16⅝ |
| Lino. and stereotype | 15½—15⅝ |
| Electrotype | 12½—13 |
| New type shell cuttings | 14½—15 |
| Hand picked type shells | 6½— 7 |
| Lino and stereo dross | 8 — 8½ |
| Electro dross | 6 — 6½ |

# Comparison of Prices . .

Advances over past week in **Heavy Type**, declines in *Italics*. Prices are f.ob. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

| Flat-Rolled Steel: (cents per pound) | Apr. 27, 1948 | Apr. 20, 1948 | Mar. 30, 1948 | Apr. 29, 1947 |
|---|---|---|---|---|
| Hot-rolled sheets | 2.80 | 2.80 | 2.80 | 2.50 |
| Cold-rolled sheets | 3.55 | 3.55 | 3.55 | 3.20 |
| Galvanized sheets (10 ga.) | 3.95 | 3.95 | 3.95 | 3.55 |
| Hot-rolled strip | 2.80 | 2.80 | 2.80 | 2.50 |
| Cold-rolled strip | 3.55 | 3.55 | 3.55 | 3.20 |
| Plates | 2.95 | 2.95 | 2.95 | 2.65 |
| Plates wrought iron | 7.25 | 7.25 | 7.25 | 5.95 |
| Stain's c-r strip (No. 302) | 30.50 | 30.50 | 30.50 | 30.50 |
| **Tin and Terneplate:** (dollars per base box) | | | | |
| Tinplate (1.50 lb) cokes. | $6.80 | $6.80 | $6.80 | $5.75 |
| Tinplate, electro (0.50 lb) | 6.00 | 6.00 | 6.00 | 5.05 |
| Special coated mfg. ternes | 5.90 | 5.90 | 5.90 | 4.90 |
| **Bars and Shapes:** (cents per pound) | | | | |
| Merchant bars | 2.90 | 2.90 | 2.90 | 2.60 |
| Cold-finished bars | 3.55 | 3.55 | 3.55 | 3.20 |
| Alloy bars | 3.30 | 3.30 | 3.30 | 3.05 |
| Structural shapes | 2.80 | 2.80 | 2.80 | 2.50 |
| Stainless bars (No. 302) | 26.00 | 26.00 | 26.00 | 26.00 |
| Wrought iron bars | 8.65 | 8.65 | 8.65 | 6.15 |
| **Wire:** (cents per pound) | | | | |
| Bright wire | 3.55 | 3.55 | 3.55 | 3.30 |
| **Rails:** (dollars per 100 lb) | | | | |
| Heavy rails | $2.75 | $2.75 | $2.75 | $2.50 |
| Light rails | 3.10 | 3.10 | 3.10 | 2.85 |
| **Semifinished Steel:** (dollars per gross ton) | | | | |
| Rerolling billets | $45.00† | $45.00† | $45.00† | $42.00 |
| Slabs, rerolling | 45.00† | 45.00† | 45.00† | 42.00 |
| Forging billets | 54.00† | 54.00† | 54.00† | 50.00 |
| Alloy blooms, billets, slabs | 66.00 | 66.00 | 66.00 | 61.00 |
| **Wire Rods and Skelp:** (cents per pound) | | | | |
| Wire rods | 2.80 | 2.80 | 2.80 | 2.55 |
| Skelp | 2.90 | 2.90 | 2.90 | 2.35 |

†Net ton

| Pig Iron: (per gross ton) | Apr. 27, 1948 | Apr. 20, 1948 | Mar. 30, 1948 | Apr. 29, 1947 |
|---|---|---|---|---|
| No. 2, foundry, Phila. | $44.61 | $44.61 | $44.61 | $36.51 |
| No. 2, Valley furnace | 39.50 | 39.50 | 39.50 | 33.50 |
| No. 2, Southern Cin'ti | 43.28 | 43.28 | 43.28 | 34.75 |
| No. 2, Birmingham | 37.38 | 37.38 | 37.38 | 29.88 |
| No. 2, foundry, Chicago† | 39.00 | 39.00 | 39.00 | 33.00 |
| Basic del'd Philadelphia | 44.11 | 44.11 | 44.11 | 36.92 |
| Basic, Valley furnace | 39.00 | 39.00 | 39.00 | 33.00 |
| Malleable, Chicago† | 39.50 | 39.50 | 39.50 | 33.50 |
| Malleable, Valley | 39.50 | 39.50 | 39.50 | 33.50 |
| Charcoal, Chicago | 62.46 | 62.46 | 62.46 | 45.99 |
| Ferromanganese‡ | 145.00 | 145.00 | 145.00 | 135.00 |

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ For carlots at seaboard.

| Scrap: (per gross ton) | | | | |
|---|---|---|---|---|
| Heavy melt'g steel, P'gh. | $40.25 | $40.25 | $40.25 | $29.75 |
| Heavy mlt'g steel, Phila. | 41.50 | 41.50 | 41.50 | 29.75 |
| Heavy melt'g steel, Ch'go | 39.25 | 39.25 | 39.00 | 30.25 |
| No. 1, hy. comp. sh't, Det. | 35.50 | 35.50 | 35.50 | 24.75 |
| Low phos. Young'n | 45.25 | 45.25 | 45.25 | 37.25 |
| No. 1, cast, Pittsburgh | 64.00 | 64.00 | 64.00 | 42.50 |
| No. 1, cast, Philadelphia | 65.50 | 65.50 | 65.50 | 45.50 |
| No. 1, cast, Chicago | 74.00 | 74.00 | 69.00 | 39.50 |
| **Coke, Connellsville:** (per net ton at oven) | | | | |
| Furnace coke, prompt | $12.50 | $12.50 | $12.50 | $10.50 |
| Foundry coke, prompt | 14.00 | 14.00 | 14.00 | 11.25 |
| **Nonferrous Metals:** (cents per pound to large buyers) | | | | |
| Copper, electro. Conn. | 21.50 | 21.50 | 21.50 | 21.50 |
| Copper, Lake Conn. | 21.625 | 21.625 | 21.625 | 21.625 |
| Tin, Grade A, New York | 94.00 | 94.00 | 94.00 | 80.00 |
| Zinc, East St. Louis | 12.00 | 12.00 | 12.00 | 10.50 |
| Lead, St. Louis | 17.30 | 17.30 | 17.30 | 14.80 |
| Aluminum, virgin | 15.00 | 15.00 | 15.00 | 15.00 |
| Nickel, electrolytic | 36.56 | 36.56 | 36.56 | 37.67 |
| Magnesium, ingot | 20.50 | 20.50 | 20.50 | 20.50 |
| Antimony, Laredo, Tex. | 33.00 | 33.00 | 33.00 | 33.00 |

# Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

| | FINISHED STEEL (Base Price) | PIG IRON | SCRAP STEEL |
|---|---|---|---|
| Apr. 27, 1948 | 3.23940¢ per lb. | $40.11 per gross ton | $40.33 per gross ton |
| One week ago | 3.23940¢ per lb. | $40.11 per gross ton | $40.33 per gross ton |
| One month ago | 3.23940¢ per lb. | $40.29 per gross ton | $40.25 per gross ton |
| One year ago | 2.86354¢ per lb. | $33.15 per gross ton | $29.92 per gross ton |

| | HIGH | LOW |
|---|---|---|
| 1948 | 3.23940¢ Feb. 17 | 3.19411¢ Jan. 6 |
| 1947 | 3.19541¢ Oct. 7 | 2.87118¢ Jan. 7 |
| 1946 | 2.83599¢ Dec. 31 | 2.54490¢ Jan. 1 |
| 1945 | 2.44104¢ Oct. 2 | 2.38444¢ Jan. 2 |
| 1944 | 2.30837¢ Sept. 5 | 2.21189¢ Oct. 5 |
| 1943 | 2.29176¢ | 2.29176¢ |
| 1942 | 2.28249¢ | 2.28249¢ |
| 1941 | 2.43078¢ | 2.43078¢ |
| 1940 | 2.30467¢ Jan. 2 | 2.24107¢ Apr. 16 |
| 1939 | 2.35367¢ Jan. 3 | 2.26689¢ May 16 |
| 1938 | 2.58414¢ Jan. 4 | 2.27207¢ Oct. 18 |
| 1937 | 2.58414¢ Mar. 9 | 2.32263¢ Jan. 4 |
| 1936 | 2.32263¢ Dec. 28 | 2.05200¢ Mar. 10 |
| 1935 | 2.07642¢ Oct. 1 | 2.06492¢ Jan. 8 |
| 1934 | 2.15367¢ Apr. 24 | 1.95757¢ Jan. 2 |
| 1933 | 1.95578¢ Oct. 3 | 1.75836¢ May 2 |
| 1932 | 1.89196¢ July 5 | 1.83901¢ Mar. 1 |
| 1931 | 1.99626¢ Jan. 13 | 1.86586¢ Dec. 29 |
| 1930 | 2.25488¢ Jan. 7 | 1.97319¢ Dec. 9 |
| 1929 | 2.31773¢ May 28 | 2.26498¢ Oct. 29 |

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

| | HIGH | LOW |
|---|---|---|
| 1948 | $40.37 Feb. 17 | $39.58 Jan. 6 |
| 1947 | 37.98 Dec. 30 | 30.14 Jan. 7 |
| 1946 | 30.14 Dec. 10 | 25.37 Jan. 1 |
| 1945 | 25.37 Oct. 23 | 23.61 Jan. 2 |
| 1944 | $23.61 | $23.61 |
| 1943 | 23.61 | 23.61 |
| 1942 | 23.61 | 23.61 |
| 1941 | $23.61 Mar. 20 | $23.45 Jan. 2 |
| 1940 | 23.45 Dec. 23 | 22.61 Jan. 2 |
| 1939 | 22.61 Sept. 19 | 20.61 Sept. 12 |
| 1938 | 23.25 June 21 | 19.61 July 6 |
| 1937 | 23.25 Mar. 9 | 20.25 Feb. 16 |
| 1936 | 19.74 Nov. 24 | 18.73 Aug. 11 |
| 1935 | 18.84 Nov. 5 | 17.83 May 14 |
| 1934 | 17.90 May 1 | 16.90 Jan. 27 |
| 1933 | 16.90 Dec. 5 | 13.56 Jan. 3 |
| 1932 | 14.81 Jan. 5 | 13.56 Dec. 6 |
| 1931 | 15.90 Jan. 6 | 14.79 Dec. 15 |
| 1930 | 18.21 Jan. 7 | 15.90 Dec. 16 |
| 1929 | 18.71 May 14 | 18.21 Dec. 17 |

Based on averages for basic iron at valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

| | HIGH | LOW |
|---|---|---|
| 1948 | $41.83 Jan. 29 | $39.75 Mar. 9 |
| 1947 | 42.58 Oct. 28 | 29.50 May 20 |
| 1946 | 31.17 Dec. 24 | 19.17 Jan. 1 |
| 1945 | 19.17 Jan. 2 | 18.92 May 22 |
| 1944 | 19.17 Jan. 11 | 15.76 Oct. 24 |
| 1943 | $19.17 | $19.17 |
| 1942 | 19.17 | 19.17 |
| 1941 | $22.00 Jan. 7 | $19.17 Apr. 10 |
| 1940 | 21.83 Dec. 30 | 16.04 Apr. 9 |
| 1939 | 22.50 Oct. 3 | 14.08 May 16 |
| 1938 | 15.00 Nov. 22 | 11.00 June 7 |
| 1937 | 21.92 Mar. 30 | 12.67 June 9 |
| 1936 | 17.75 Dec. 21 | 12.67 June 8 |
| 1935 | 13.42 Dec. 10 | 10.33 Apr. 29 |
| 1934 | 13.00 Mar. 13 | 9.50 Sept. 25 |
| 1933 | 12.25 Aug. 8 | 6.75 Jan. 3 |
| 1932 | 8.50 Jan. 12 | 6.43 July 5 |
| 1931 | 11.33 Jan. 6 | 8.50 Dec. 29 |
| 1930 | 15.00 Feb. 18 | 11.25 Dec. 9 |
| 1929 | 17.58 Jan. 29 | 14.08 Dec. 8 |

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

# Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points in cents per pound or dollars per gross ton unless otherwise indicated. Extras apply. Delivered prices do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 20¢ per base box. (6) For merchant trade. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb & over. (9) Carload lot in manufacturing trade. (10) Delivered Los Angeles only. (11) Hollowware enameling, gages 29 to 31 only. (12) Produced to dimensional tolerances in AISI Manual Sec. 6. (13) Delivered San Francisco only. (14) Kaiser Co. prices (15) to 0.035 to 0.075 in. thick by ¾ to 3½ in. wide. (16) Delivered Los Angeles; add ½¢ per 100 lb for San Francisco. (17) Slab prices subject to negotiation in most cases. Some producers charge (18) $2 more. (19) $1 per ton more.

| Basing Points | Pitts-burgh | Chicago | Gary | Cleve-land | Birm-ingham | Buffalo | Youngs-town | Spar-rows Point | Granite City | Middle-town, Ohio | | San Franc'co, Los Angeles, Seattle | DELIVERED TO Detroit | New York | Phila-delphia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INGOTS Carbon, rerolling | ($36.00 per net ton f. o. b. mill) (Spot market as high as $75 to $90 gross ton) | | | | | | | | | | | | | | |
| Carbon, forging | $46.00 | (per net ton) | | | | | | | | | | | | | |
| Alloy | $56.00 | | | | | | | | | (Canton = $56.00) | | | | | |
| BILLETS, BLOOMS, SLABS Carbon, rerolling[17] | $45.00[18] | $45.00[18] | $45.00[18] | $47.00 | $45.00[18] | $45.00[18] | (per net ton) | | | | | | | | |
| Carbon forging billets | $54.00 | $54.00 | $54.00 | $54.00 | $54.00 | $54.00 | (per net ton) | | | | | | | | |
| Alloy | $66.00 | $66.00 | | | | $66.00 | (Bethlehem, Massillon, Canton = $66.00) | | | | | | | | |
| SHEET BARS | | | | | | | | Subject to negotiation | | | | | | | |
| PIPE SKELP | 2.90¢ | | | | | | 2.90¢ | | | | | | | | |
| WIRE RODS | 2.80¢[19] | 2.80¢ | | 2.80¢ | 2.65¢ | | (Worcester = 2.90¢) | | | | | 3.52¢[13] | | | |
| SHEETS Hot-rolled | 2.80¢ | 2.80¢ | 2.80¢ | 2.80¢ | 2.80¢ | 2.80¢ | 2.80¢ | 2.80¢ | | (Ashland, Ky. = 2.80¢) | | 3.54¢[16] | 3.01¢ | 3.148¢ | 3.040¢ |
| Cold-rolled[1] | 3.55¢ | 3.55¢ | 3.55¢ | 3.55¢ | | 3.55¢ | 3.55¢ | | 3.65¢ | 3.55¢ | | | 3.76¢ | 4.00¢ | 4.008¢ |
| Galvanized (10 gage) | 3.95¢ | 3.95¢ | 3.95¢ | | 3.95¢ | | 3.95¢ | 3.95¢ | 4.05¢ | 3.95¢ | (Ashland = 3.95¢) | 4.62¢[16] | | 4.298¢ | 4.190¢ |
| Enameling (12 gage) | 3.95¢ | 3.95¢ | 3.95¢ | 3.95¢ | | | 3.95¢ | | 4.05¢ | 3.95¢ | | | 4.18¢ | 4.466¢ | 4.406¢ |
| Long ternes[2] (10 gage) | 4.05¢ | | 4.05¢ | | | | | | | | | | | 4.566¢ | 4.506¢ |
| STRIP Hot-rolled[3] | 2.80¢ | 2.80¢ | 2.80¢ | 2.80¢[13] | 2.80¢ | | 2.80¢ | | | | | 3.60¢[16] | 3.01¢ | 3.316¢ | 3.256¢ |
| Cold-rolled[4] | 3.55¢ | 3.65 | 3.65¢ | 3.55¢ | | | 3.55¢ | | | (Worcester = 3.75¢) | | | 3.76¢ | 4.066¢ | 4.006¢ |
| Cooperage stock | 3.10¢ | 3.10¢ | | | 3.10¢ | | 3.10¢ | | | | | | | 3.616¢ | |
| TINPLATE Cokes, 1.50 lb[5], base box | $6.80 | $6.80 | $6.80 | | $6.90 | | | $6.90 | $6.90 | (Warren, Ohio = $6.80) | | | | $7.248 | $7.140 |
| Electro, box (0.25 lb) | Deduct $1.00 from 1.50 lb coke base box price. | | | | | | | | | | | | | | |
| Electro, box (0.50 lb) | Deduct 80¢ from 1.50 lb coke base box price. | | | | | | | | | | | | | | |
| Electro, box (0.75 lb) | Deduct 60¢ from 1.50 lb coke base box price. | | | | | | | | | | | | | | |
| TERNES, MFG., special coated | Deduct 90¢ from 1.50 lb coke base box price. | | | | | | | | | | | | | | |
| BLACKPLATE, CANMAKING 55 lb to 70 lb | Deduct $1.60 from 1.50 lb coke base box. | | | | | | | | | | | | | | |
| BLACKPLATE, CANMAKING 75 lb to 95 lb | Deduct $1.70 from 1.50 lb coke base box. | | | | | | | | | | | | | | |
| BLACKPLATE, CANMAKING 100 lb to 128 lb | Deduct $1.60 from 1.50 lb coke base box. | | | | | | | | | | | | | | |
| BLACKPLATE, h. e. 29 ga[11] | 4.75¢ | 4.75¢ | 4.75¢ | | 4.85¢ | | | 4.85¢ | 4.85¢ | | | | | 5.198¢ | 5.090¢ |
| BARS Carbon steel | 2.90¢ | 2.90¢ | 2.90¢ | 2.90¢ | 2.90¢ | 2.90¢ | 2.90¢ | | | | | 3.625¢[16] | 3.11¢ | 3.35¢ | 3.356¢ |
| Rail steel[6] | Subject to negotiation because of fluctuating scrap prices. | | | | | | | | | | | | | | |
| Reinforcing (billet)[7] | 2.75¢ | 2.75¢ | 2.75¢ | 2.75¢ | 2.75¢ | 2.75¢ | 2.75¢ | 2.75¢ | | | | 3.325¢[16] | | 3.098¢ | 2.990¢ |
| Reinforcing (rail) | Subject to negotiation because of fluctuating scrap prices. | | | | | | | | | | | | | | |
| Cold-finished[8] | 3.55¢ | 3.55¢ | 3.55¢ | 3.55¢ | | 3.55¢ | | | | | | | 3.71¢ | 4.00¢ | 4.006¢ |
| Alloy, hot-rolled | 3.30¢ | 3.30¢ | 3.30¢ | | | 3.30¢ | 3.30¢ | (Bethlehem, Massillon, Canton = 3.30¢) | | | | | 3.51¢ | | 3.432¢ |
| Alloy, cold-drawn | 4.10¢ | 4.10¢ | 4.10¢ | 4.10¢ | | 4.10¢ | | | (Canton = 4.10¢) | | | | | | |
| PLATE Carbon Steel[13] | 2.95¢ | 2.95¢ | 2.95¢ | 2.95¢ | 2.95¢ | | 2.95¢ | (Coatesville = 3.45¢, Claymont = 3.65¢, Geneva, Utah = 3.10¢) 2.95¢ | | | | 3.838¢[14] | | 3.298¢ | 3.190¢ |
| Floor plates | 4.20¢ | 4.20¢ | | 4.20¢ | | | | | | | | | | 4.716¢ | 4.656¢ |
| Alloy | 3.80¢ | 3.80¢ | 3.80¢ | | (Coatesville = 4.80¢) | | | | | | | | | 4.316¢ | 4.256¢ |
| SHAPES, Structural | 2.80¢ | 2.80¢ | 2.80¢ | | 2.80¢ | 2.80¢ | (Geneva, Utah = 2.95¢, Bethlehem = 2.80¢) | | | | | 3.43¢[10] | | 3.040¢ | 2.932¢ |
| SPRING STEEL, C-R 0.08 to 0.40 carbon | 3.55¢ | | | 3.55¢ | | | (Worcester = 3.75¢) | | | | | | | | |
| 0.41 to 0.60 carbon | 5.05¢ | | | 5.05¢ | | | (Worcester = 5.25¢) | | | | | | | | |
| 0.61 to 0.80 carbon | 5.65¢ | | | 5.65¢ | | | (Worcester = 5.85¢) | | | | | | | | |
| 0.81 to 1.05 carbon | 7.15¢ | | | 7.15¢ | | | (Worcester = 7.35¢) | | | | | | | | |
| 1.06 to 1.35 carbon | 9.45¢ | | | 9.45¢ | | | (Worcester = 9.65¢) | | | | | | | | |
| MANUFACTURERS' WIRE[9] Bright | 3.55¢ | 3.55¢ | | 3.55¢ | 3.55¢ | | (Worcester = 3.65¢, Duluth = 3.60¢) | | | | | 4.56¢[13] | | 4.022¢ | 4.006¢ |
| Galvanized | Add proper size extra and galvanizing extra to Bright Wire Base | | | | | | | | | | | | | | |
| Spring (high carbon) | 4.60¢ | 4.60¢ | | 4.60¢ | (Worcester = 4.70¢, Duluth = 4.85¢) (Trenton = 4.85¢) | | | | | | | 5.737¢[13] | | 5.072¢ | 4.964¢ |
| PILING, Steel sheet | 3.30¢ | 3.30¢ | | | | 3.30¢ | | | | | | | | 3.75¢ | 3.756¢ |

## CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

| Basing Point | Chromium Nickel | | Straight Chromium | | | |
|---|---|---|---|---|---|---|
| | No. 304 | No. 302 | No. 410 | No. 430 | No. 442 | No. 446 |
| Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila. | Subject to negotiation | | | Subject to negotiation | | |
| Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt. | Subject to negotiation | | | Subject to negotiation | | |
| Slabs, P'gh, Chi, Canton, Balt, Phila, Reading | Subject to negotiation | | | Subject to negotiation | | |
| Billets, P'gh, Chi, Canton, Watervliet, Syracuse, Balt, Beth. | Subject to negotiation | | | Subject to negotiation | | |
| Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville, Beth, Brackenridge | 23.00 | 22.50 | 17.50 | 17.50 | 21.00 | 25.50 |
| Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville, Beth, Brackenridge | 27.50 | 26.00 | 20.50 | 21.00 | 24.50 | 30.00 |
| Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet, Beth, Brackenridge | 27.50 | 26.00 | 20.50 | 21.00 | 24.50 | 30.00 |
| Plates, P'gh, Middletown, Canton, Brackenridge, Balt, Coatesville | 31.50 | 29.50 | 23.50 | 24.00 | 28.00 | 33.00 |
| Shapes, structural, P'gh, Chi, Brackenridge | 27.50 | 26.00 | 20.50 | 21.00 | 24.50 | 30.00 |
| Sheets, P'gh, Chi, Middletown, Canton, Balt, Brackenridge | 39.00 | 37.00 | 29.00 | 31.50 | 35.50 | 39.50 |
| Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown | 25.50 | 23.50 | 18.50 | 19.00 | 26.00 | 38.00 |
| Strip, c-r, P'gh, Cleve, Jersey City, Reading, Canton, Youngstown, Balt, W. Leechburg | 32.50 | 30.50 | 24.00 | 24.50 | 35.00 | 56.50 |
| Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila, Ft. Wayne, Brackenridge | 27.50 | 26.00 | 20.50 | 21.00 | 24.50 | 30.00 |
| Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton, W. Leechburg | 32.46 | 30.30 | 23.80 | 24.34 | 34.82 | 56.28 |
| Rod, h-r, Syracuse | 27.05 | 25.97 | 20.02 | 20.56 | 24.34 | 28.78 |
| Tubing, seamless, P'gh, Chi, Canton, Brackenridge, Milwaukee | 72.09 | 72.09 | ..... | 68.49 | ..... | ..... |

## TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, Ohio)*

| W | Cr | V | Mo | Co | Base per lb |
|---|---|---|---|---|---|
| 18 | 4 | 1 | — | — | 82¢ |
| 18 | 4 | 1 | — | 5 | $1.29 |
| 18 | 4 | 2 | — | — | 93¢ |
| 1.5 | 4 | 1.5 | 8 | — | 59¢ |
| 6 | 4 | 2 | 6 | — | 63¢ |

| | |
|---|---|
| High-carbon-chromium* | 47¢ |
| Oil hardening manganese* | 26¢ |
| Special carbon* | 24¢ |
| Extra carbon* | 20¢ |
| Regular carbon* | 17¢ |

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi, 4¢ higher.

## ELECTRICAL SHEETS

*Base, all grades f.o.b. Pittsburgh*

| | Per lb |
|---|---|
| Armature | 4.80¢ to 5.05¢ |
| Electrical | 5.30¢ to 5.55¢ |
| Motor | 6.05¢ to 6.30¢ |
| Dynamo | 6.75¢ to 7.50¢ |
| Transformer 72 | 7.25¢ to 8.25¢ |
| Transformer 65 | 7.95¢ to 9.20¢ |
| Transformer 58 | 8.65¢ to 9.90¢ |
| Transformer 52 | 9.45¢ to 9.70¢ |

F.o.b. Chicago and Gary: armature through motor only. F.o.b. Granite City add to lower quotation 0.45¢ for armature through & including 72, and 0.35¢ for balance.

## RAILS, TRACK SUPPLIES

*(F.o.b. mill)*

| | |
|---|---|
| Standard rails, heavier than 60 lb | |
| No. 1 O.H., per 100 lb | $2.75 |
| Angle splice bars, 100 lb | 3.85 |
| Light rails (from billets) per 100 lb. | 3.10 |

| | Base per lb |
|---|---|
| Cut spikes | 4.85¢ |
| Screw spikes | 6.90¢ |
| Tie plate, steel | 3.65¢ |
| Tie plates, Pittsburg, Calif. | 3.80¢ |
| Track bolts | 7.00¢ |
| Track bolts, heat treated, to railroads | 7.25¢ |

## ROOFING TERNEPLATE

*(F.o.b. Pittsburgh, 112 sheets)*

| | 20x14 in. | 20x28 in. |
|---|---|---|
| 8-lb coating I.C. | $7.05 | $14.10 |

## CLAD STEEL

*Base prices, cents per pound*

| Stainless-clad | Plate | Sheet |
|---|---|---|
| No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa. | *24.00 | *22.00 |
| Nickel-clad 10 pct, f.o.b. Coatesville, Pa. | 21.50 | .... |
| Inconel-clad 10 pct, f.o.b. Coatesville | 30.00 | .... |
| Monel-clad 10 pct, f.o.b. Coatesville | 24.00 | .... |
| Aluminized steel Hot dip, 20 gage, f.o.b. Pittsburgh | .... | 9.00 |

* Includes annealing and pickling, or sandblasting.

## MERCHANT WIRE PRODUCTS

*To the dealer, f.o.b. Pittsburgh, Chicago, Birmingham*

| | Base Column | San Francisco |
|---|---|---|
| Standard & coated nails* | 94 | 115 |
| Galvanized nails* | 94 | 115 |
| Woven wire fence† | 100 | 123 |
| Fence posts, carloads†† | 105 | ... |
| Single loop bale ties | 99 | 123 |
| Galvanized barbed wire** | 113 | 133 |
| Twisted barbless wire | 113 | ... |

* Also Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80-rod spools, in carloads. †† Pittsburgh, Duluth only.

| | Base per 100 lb | San Francisco |
|---|---|---|
| Annealed fence wire ‡ | $4.20 | $5.21 |
| Annealed, galv. fencing ‡ | 4.65 | 5.66 |
| Cut nails, carloads ‡‡ | 6.30 | ... |

‡ Add 10¢ at Worcester. ‡‡ Pittsburgh only, less 20¢ to jobbers.

## HIGH STRENGTH, LOW ALLOY STEELS

base prices, cents per pound

| Steel | Alde-cor | Corten | Double Strength No. 1 | Dyn-alloy | HI Steel | Mayari R | Otis-coloy | Yoloy | NAX High Tensile |
|---|---|---|---|---|---|---|---|---|---|
| Producer | Repub-lic | Carnegie-Illinois, Republic | Repub-lic | Alan Wood | Inland | Bethle-hem | Jones & Laughlin | Youngs-town Sheet & Tube | Great Lakes Steel |
| Plates | 4.55 | 4.55 | 4.55 | 4.55 | 4.55 | 4.55 | 4.55 | 4.55 | 4.55 |
| Sheets | | | | | | | | | |
| Hot-rolled | 4.30 | 4.30 | 4.30 | 4.30 | 4.30 | 4.30 | 4.30 | 4.30 | 4.30 |
| Cold-rolled | 5.30 | 5.30 | 5.30 | .... | 5.30 | 5.30 | 5.30 | 5.30 | 5.30 |
| Galvanized | | 6.00 | .... | .... | .... | 6.00 | .... | .... | .... |
| Strip | | | | | | | | | |
| Hot-rolled | 4.30 | 4.30 | 4.30 | .... | 4.30 | 4.30 | 4.30 | 4.30 | 4.30 |
| Cold-rolled | .... | .... | 5.30 | .... | .... | 5.30 | 5.30 | 5.30 | 5.30† |
| Shapes | .... | 4.30 | .... | .... | 4.30 | 4.30 | 4.30 | 4.30 | .... |
| Beams | .... | 4.30 | .... | .... | .... | 4.30 | .... | .... | .... |
| Bars | | | | | | | | | |
| Hot-rolled | 4.45 | 4.45 | 4.45 | .... | .... | 4.45 | 4.45 | 4.45 | 4.45 |
| Bar shapes | .... | 4.45 | .... | .... | 4.45 | 4.45 | 4.45 | 4.45 | .... |

† Pittsburgh, add 0.10¢ at Chicago and Gary.

## PIPE AND TUBING

*Base discounts, f.o.b. Pittsburgh and Lorain, steel buttweld and seamless. Others f.o.b. Pittsburgh only*
*Base price, $200.00 per net ton*

### *Standard, threaded & coupled*

| Steel, buttweld | Black | Galv. |
|---|---|---|
| ⅛-in. | 47 | 29½ |
| ¼-in. | 50 | 33½ |
| ⅜-in. | 52½ | 36½ |
| 1 ¼-in. | 53 | 37 |
| 1 ½-in. | 53½ | 37½ |
| 2-in. | 54 | 38 |
| 2½ and 3-in. | 54½ | 38½ |
| Wrought Iron, buttweld | | |
| ⅛-in. | +11 | +35 |
| ¼-in. | + 1½ | +25 |
| 1 and 1¼-in. | 4 | +16½ |
| 1½-in. | 9½ | +13 |
| 2-in. | 10 | +12½ |
| Steel, lapweld | | |
| 2-in. | 44½ | 28 |
| 2½ and 3-in. | 48½ | 32 |
| 3½ to 6-in. | 50½ | 34 |
| Steel, seamless | | |
| 2-in. | 43½ | 27 |
| 2½ and 3-in. | 46½ | 30 |
| 3½ to 6-in. | 48½ | 32 |
| Wrought Iron, lapweld | | |
| 2-in. | 1½ | +20 |
| 2½ to 3½-in. | 4 | +16 |
| 4-in. | 8 | +10½ |
| 4½ to 8-in. | 6 | +12 |

### *Extra Strong, plain ends*

| Steel, buttweld | | |
|---|---|---|
| ⅛-in. | 46 | 30 |
| ¼-in. | 50 | 34 |
| 1-in. | 52 | 37 |
| 1 ¼-in. | 52½ | 37½ |
| 1 ½-in. | 53 | 38 |
| 2-in. | 53½ | 38½ |
| 2½ and 3-in. | 54 | 39 |
| Wrought Iron, buttweld | | |
| ⅛-in. | + 6½ | +29 |
| ¼-in. | + ½ | +23 |
| 1 and 1¼ in. | 4 | +16½ |
| 2-in. | 10 | +12½ |
| Steel, lapweld | | |
| 2-in. | 43½ | 28 |
| 2½ and 3-in. | 48½ | 33 |
| 3½ to 6-in. | 52 | 36½ |
| Steel, seamless | | |
| 2-in. | 42½ | 27 |
| 2½ and 3-in. | 46½ | 31 |
| 3½ and 6-in. | 50 | 34½ |
| Wrought Iron, lapweld | | |
| 2-in. | 4½ | +16½ |
| 2½ to 4-in. | 13 | + 6 |
| 4½ to 6-in. | 9 | +10½ |

Basing discounts for standard pipe are for threads and couplings. For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all buttweld. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

## BOILER TUBES

*Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft, f.o.b. Pittsburgh in carload lots, cut length 4 to 24 ft, inclusive.*

| OD in In. | Gage BWG | Seamless Hot-Rolled | Seamless Cold-Drawn | Electric Weld Hot-Rolled | Electric Weld Cold-Drawn |
|---|---|---|---|---|---|
| 2 | 13 | $17.84 | $20.99 | $17.30 | $20.36 |
| 2½ | 12 | 23.99 | 28.21 | 23.27 | 27.36 |
| 3 | 12 | 26.68 | 31.40 | 25.88 | 30.46 |
| 3½ | 11 | 33.35 | 39.26 | 32.35 | 38.08 |
| 4 | 10 | 41.40 | 48.70 | 40.16 | 47.24 |

## CAST IRON WATER PIPE

*Per net ton*

6-in. to 24-in. del'd Chicago ..... $91.12
3-in. to 24-in. del'd New York .... 89.18
6-in. to 24-in., Birmingham ..... 79.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles for all rail shipment; rail and water shipment less ..... 105.90
Class "A" and gas pipe, $5 extra: 4-in. pipe is $5 a ton above 6-in.

## BOLTS, NUTS, RIVETS, SET SCREWS

***Consumer Prices***

*(Bolts and nuts f.o.b Pittsburgh, Cleveland, Birmingham or Chicago)*

*Base discount less case lots*

### *Machine and Carriage Bolts*

| | Percent Off List |
|---|---|
| ½ in. & smaller x 6 in. & shorter | 45 |
| 9/16 & ⅝ in. x 6 in. & shorter | 46 |
| ¾ in. & larger x 6 in. & shorter | 43 |
| All diam, longer than 6 in. | 41 |
| Lag, all diam over 6 in. long | 44 |
| Lag, all diam x 6 in. & shorter | 46 |
| Plow bolts | 54 |

### *Nuts, Cold Punched or Hot Pressed*

*(Hexagon or Square)*

| | |
|---|---|
| ½ in. and smaller | 43 |
| 9/16 to 1 in. inclusive | 42 |
| 1⅛ to 1½ in. inclusive | 40 |
| 1⅝ in. and larger | 35 |

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

| *Semifin. Hexagon Nuts* | USS | SAE |
|---|---|---|
| 7/16 in. and smaller | .. | 46 |
| ½ in. and smaller | 44 | .. |
| ½ in. through 1 in. | .. | 44 |
| 9/16 in. through 1 in. | 43 | .. |
| 1⅛ in. through 1½ in. | 41 | 42 |
| 1⅝ in. and larger | 35 | .. |

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

### *Stove Bolts*

Packages, nuts separate ..... 65 and 10
In bulk ..... 75

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

### *Large Rivets* (½ in. and larger)

*Base per 100 lb*

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham ..... $5.65
F.o.b. Lebanon, Pa. ..... 5.80

### *Small Rivets* (7/16 in. and smaller)

*Percent Off List*

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham ..... 55

### *Cap and Set Screws*

| *(In packages)* | Percent Off List |
|---|---|
| Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright | 53 |
| ¾ to 1 in. x 6 in., SAE 1035, heat treated | 44 |
| Set screws, oval points | 56 |
| Milled studs | 29 |
| Flat head cap screws, listed sizes | 16 |
| Fillister head cap, listed sizes | 37 |

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

## FLUORSPAR

Metallurgical grade, f.o.b. producing plant.

| Effective $CaF_2$ Content: | Base price per short ton |
|---|---|
| 70% or more | $35.00 |
| 65% but less than 70% | 34.00 |
| 60% but less than 65% | 33.00 |
| Less than 60% | 32.00 |

## LAKE SUPERIOR ORES

*(51.50% Fe, Natural Content, Delivered Lower Lake Ports)*

| | Per Gross Ton |
|---|---|
| Old range, bessemer | $6.60 |
| Old range, nonbessemer | 6.45 |
| Mesabi, bessemer | 6.35 |
| Mesabi, nonbessemer | 6.20 |
| High phosphorus | 6.20 |

Increases or decreases in freight rates, dock handling charges and taxes after Apr. 1, 1948, are to be added to above prices.

## METAL POWDER

*Prices in cents per pound in ton lots, f.o.b. shipping point.*

Brass, minus 100 mesh ..... 24¢ to 28½¢
Copper, electrolytic, 100 and 325 mesh ..... 30⅝¢ to 34⅝¢
Copper, reduced, 150 and 200 mesh ..... 30½¢ to 32¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe carlots .. 11.5¢ to 14.5¢
Swedish sponge iron, 100 mesh, c.l.f. N. Y., carlots, ocean bags .. 7.4¢ to 8.5¢
Domestic sponge iron, minus 48 mesh ..... 10¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots ..... 5¢
Iron, hydrogen reduced, minus 80 mesh, 98 + % Fe ..... 11.00¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots ..... 63¢ to 80¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe .. 44¢
Iron, electrolytic, annealed, 100, minus 200 mesh, 99.5 + % Fe ..... 19.5¢ to 23.5¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe ..... 39½¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe ..... 90¢ to $1.75
Aluminum, 100, 200 mesh, carlots ..... 23¢ to 29¢
Antimony, 100 mesh ..... 44¢
Cadmium, 100 mesh ..... $2.00
Chromium, 100 mesh and finer .. $1.025
Lead, 100, 200 & 300 mesh 20½¢ to 25½¢
Manganese, minus 325 mesh and coarser ..... 59¢
Nickel, 100 mesh ..... 51½¢
Silicon, 100 mesh ..... 29¢
Solder powder, 100 mesh .. 8½¢ plus metal
Stainless steel, 302, minus 100 mesh 75¢
Tin, 100 mesh ..... 90¢
Tungsten metal powder, 98%-99%, any quantity, per lb. ..... $2.90
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb .. $2.65
Under 100 lb ..... $2.90

## COKE

| | Net Ton |
|---|---|
| Furnace, beehive (f.o.b. oven) Connellsville, Pa. | $12.00 to $13.00 |
| Foundry, beehive (f.o.b. oven) Connellsville, Pa. | 13.50 to 14.50 |
| Foundry, Byproduct | |
| Chicago, del'd | $18.60 |
| Chicago, f.o.b. | 17.50 |
| New England, del'd | 20.40 |
| Seaboard, Kearney, N. J., f.o.b. | 17.85 |
| Philadelphia, f.o.b. | 17.75 |
| Swedeland, Pa., f.o.b. | 17.75 |
| Buffalo, del'd | 20.15 |
| Ashland, Ohio, f.o.b. | 15.50 |
| Painesville, Ohio, f.o.b. | 16.60 |
| Erie, del'd | 19.95 |
| Cleveland, del'd | 17.90 |
| Cincinnati, del'd | 18.59 |
| St. Louis, del'd | 18.05 |
| Birmingham, del'd | 15.76 |

## REFRACTORIES

*(F.o.b. Works)*

| *Fire Clay Brick* | Carloads, Per 1000 |
|---|---|
| No. 1 Ohio | $67.00 |
| First quality, Pa., Md., Ky., Mo., Ohio | 73.00 |
| First quality, New Jersey | 78.00 |
| Sec. quality, Pa., Md., Ky., Mo., Ohio | 67.00 |
| Sec. quality, New Jersey | 70.00 |
| No. 2 Ohio | 59.00 |
| Ground fire clay, net ton, bulk | 10.50 |
| ***Silica Brick*** | |
| Pennsylvania and Birmingham | $73.00 |
| Chicago District and Alabama | 82.00 |
| Silica cement, net ton (Eastern) | 12.50 |
| East Chicago | 13.50 |
| ***Chrome Brick*** | *Per Net Ton* |
| Standard chemically bonded, Balt., Plymouth Meeting, Chester | $64.00 |
| ***Magnesite Brick*** | |
| Standard, Balt. and Chester | $86.00 |
| Chemically bonded, Baltimore | 75.00 |
| ***Grain Magnesite*** *std. ⅜-in. grains* | |
| Domestic, f.o.b. Balt. and Chester in bulk, fines removed | $51.50 |
| Domestic, f.o.b. Chewelah, Wash., in bulk with fines | 27.00 |
| in sacks with fines | 31.50 |
| ***Dead Burned Dolomite*** | |
| F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk. Midwest, add 10¢; Missouri Valley, add 20¢ | $11.05 |

## WAREHOUSE PRICES

*Base prices, delivered metropolitan areas, per 100 lb.*

| CITIES | SHEETS | | | STRIP | | PLATES | SHAPES | BARS | | ALLOY BARS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hot-Rolled | Cold-Rolled (15 gage) | Galvanized (10 gage) | Hot-Rolled | Cold-Rolled | | Standard Structural | Hot-Rolled | Cold-Finished | Hot-Rolled, A 4615 As-rolled | Hot-Rolled, A 4140-50 Ann. | Cold-Drawn, A 4615 As-rolled | Cold-Drawn, A 4140-50 Ann. |
| Philadelphia | $4.56 | $5.77 | $5.90 | $4.82 | $5.90 | $4.85 | $4.57 | $4.87 | $5.75 | $8.47 | $8.77 | $10.30 | $10.45 |
| New York | 4.75 | 5.76[1] | 6.16 | 5.08 | 6.08 | 5.11 | 4.80 | 5.06 | 5.80 | 8.65 | 8.83 | 10.35 | 10.50 |
| Boston | 4.83 | 5.69 | 6.23[12] | 5.61 | 6.87 | 5.18 | 4.91 | 5.04 | 5.88 | 8.99 | 9.14 | 10.43 | 10.58 |
| Baltimore | 4.32 | .... | 5.72 | 4.80 | .... | 4.77 | 4.71 | 4.85 | 5.71 | .... | .... | .... | .... |
| Norfolk | 4.90 | .... | .... | 5.30 | .... | 5.15 | 5.15 | 5.20 | 6.00 | .... | .... | .... | .... |
| Chicago | 4.25 | 5.10 | 5.65 | 4.35 | 5.45-6.65 | 4.60 | 4.40 | 4.40 | 5.10 | 8.20 | 8.35 | 9.50 | 9.65 |
| Milwaukee | 4.458 | 5.308 | 5.858 | 5.058 | 5.658 | 4.808 | 4.608 | 4.608 | 5.395 | 8.645 | 8.795 | 9.945 | 10.095 |
| Cleveland | 4.25 | 5.10[1] | 5.82 | 5.05 | .... | 4.60† | 4.70 | 4.40 | 5.10 | 8.61 | 8.76 | 9.50 | 9.65 |
| Buffalo | 4.25 | 5.10 | 6.03 | 5.23 | 5.72[5] | 4.98 | 4.40 | 4.40‡ | 5.10 | 8.20 | 8.35 | 9.50 | 9.65 |
| Detroit | 4.41 | 5.28 | 6.07 | 4.77 | 5.67 | 4.9 † | 4.82 | 4.56-4.82 | 5.26 | 8.82 | 8.97 | 10.09 | 10.24 |
| Cincinnati | 4.56 | 5.22 | 5.77 | 4.77 | .... | 4.98 | 4.82 | 4.78 | 5.63 | .... | .... | .... | .... |
| St. Louis | 4.61 | 5.48 | 6.22 | 4.71 | 6.02 | 4.96 | 4.76 | 4.78 | 5.67 | 8.92 | 9.07 | 10.22 | 10.37 |
| Pittsburgh | 4.25 | 5.10[1] | 5.65 | 4.35 | .... | 4.60 | 4.40 | 4.40 | 5.10 | 8.20 | 8.35 | 9.50 | 9.65 |
| St. Paul | 4.68 | 5.53 | 6.08 | 4.78 | .... | 5.03 | 4.83 | 4.83 | 6.00 | .... | .... | .... | .... |
| Omaha | 5.262 | .... | 6.712 | 5.362 | .... | 5.612 | 5.412 | 5.412 | 6.112 | .... | .... | .... | .... |
| Indianapolis | 4.55 | 5.38 | 5.93 | 4.65 | 5.95 | 4.90 | 4.70 | 4.70 | 5.57 | .... | .... | .... | .... |
| Birmingham | 4.45[11] | .... | 5.80 | 4.45[11] | .... | 4.65[11] | 4.40[11] | 4.40[11] | 6.13 | .... | .... | .... | .... |
| Memphis | 4.88[11] | 5.94[1] | 6.43 | 5.08[11] | .... | 5.23[11] | 5.03[11] | 5.03[11] | 5.94 | .... | .... | .... | .... |
| New Orleans | *5.05[11] | 6.39[1] | .... | 5.25[11] | .... | 5.40[11] | *5.10[11] | *5.20[11] | 6.39[6] | .... | .... | .... | .... |
| Houston | 5.55 | .... | 7.05 | 5.65 | .... | 5.90 | 5.70 | 5.70 | 7.00 | 9.40 | 9.25 | 10.40 | 10.55 |
| Los Angeles | 5.75 | 7.35[1] | 7.40 | 6.05 | 8.70[5] | 5.55 | 5.35 | 5.50 | 7.35[14] | 9.70[15] | 9.55[10] | 11.15[15] | 11.30[15] |
| San Francisco | 5.40[8] | 6.65 | 7.05 | 5.75[8] | 8.70 | 5.50 | 5.30 | 5.05 | 7.50 | 9.70[15] | 9.55[15] | 11.15[15] | 11.30[15] |
| Seattle | 5.45[4] | 7.25[2] | 7.10 | 5.60[4] | .... | 5.90 | 5.25[4] | 5.45[4] | 7.45[14] | .... | 8.95[16] | .... | 11.30[16] |
| Portland | 5.45[4] | 7.25[2] | 7.10 | 5.85[4] | .... | 5.70[4] | 5.40[4] | 5.55[4] | 7.45[14] | .... | 8.95[16] | .... | 11.30[16] |
| Salt Lake City | 6.40 | .... | 7.85 | 6.70 | .... | 6.20 | 6.35 | 6.55 | 7.55 | .... | .... | .... | .... |

## BASE QUANTITIES

*Standard unless otherwise keyed on prices.*

**HOT-ROLLED:** Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

**COLD-ROLLED:** Sheets, 400 to 1999 lb; strip, extras on all quantities; bars 1000 lb and over.

**ALLOY BARS:** 1000 to 1999 lb.

**GALVANIZED SHEETS:** 450 to 1499 lb.

**EXCEPTIONS:** (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb.

* Add 46¢ for sizes not rolled in Birmingham

† Up to ¾ in. thick and 90 in. wide.

‡ Add 38¢ for sizes not rolled at Buffalo.

## PIG IRON PRICES

*Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.*

| BASING POINT* PRICES | | | | | | DELIVERED PRICES† (BASE GRADES) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Basing Point | Basic | No. 2 Foundry | Malleable | Bessemer | Low Phos. | Consuming Point | Basing Point | Freight Rate | Basic | No. 2 Foundry | Malleable | Bessemer | Low Phos. |
| Bethlehem | 40.00 | 40.50 | 41.00 | 41.50 | ..... | Boston | Everett | $0.50 Arb. | .... | 45.50 | 46.00 | .... | ..... |
| Birmingham | 38.88 | 38.38-39.38 | .... | .... | ..... | Boston | Steelton | 5.78 | 45.78 | .... | .... | .... | 51.78 |
| Buffalo | 40.00-41.88* | 40.00-42.38* | 40.50 42.88* | ..... | ..... | Brooklyn | Bethlehem | 3.60 | 43.60 | 44.10 | 44.60 | 45.10 | ..... |
| Chicago | 38.50 | 39.00 | 39.50 | 40.00 | ..... | Cincinnati | Birmingham | 5.85 | 44.73 | 42.23-45.23 | .... | .... | ..... |
| Cleveland | 38.50-39.75* | 39.00-40.25* | 39.50-40.75* | ..... | ..... | Jersey City | Bethlehem | 2.21 | 42.21 | 42.71 | 43.21 | 43.71 | ..... |
| Duluth | 39.00 | 39.50 | 40.00 | 40.50 | ..... | Los Angeles | Provo | 7.13 | 46.13 | 46.63 | .... | .... | ..... |
| Erie | 38.50 | 39.00 | 39.50 | 40.00 | ..... | Mansfield | Cleveland-Toledo | 2.56 | 41.06-42.31** | 41.56-42.81* | 42.06 43.31* | 42.56 | ..... |
| Everett | .... | 45.00 | 45.50 | .... | ..... | Philadelphia | Bethlehem | 2.00 | 42.00 | 42.50 | 43.00 | 43.50 | ..... |
| Granite City | 39.50 | 40.00 | 40.50 | .... | ..... | Philadelphia | Swedeland | 1.21 | 46.21 | 46.71 | 47.21 | 47.71 | ..... |
| Neville Island | 39.00 | 39.50 | 39.50 | 40.00 | ..... | Philadelphia | Steelton | 2.59 | 42.59 | .... | .... | .... | 48.59 |
| Provo | 39.00 | 39.50 | .... | .... | ..... | San Francisco | Provo | 7.13 | 46.13 | 46.63 | .... | .... | ..... |
| Sharpsville | 39.00 | 39.50 | 39.50 | 40.00 | ..... | Seattle | Provo | 7.13 | 46.13 | 46.63 | .... | .... | ..... |
| Steelton | 40.00 | .... | .... | .... | 46.00 | St. Louis | Granite City | 0.75 Arb. | 40.25 | 40.75 | 41.25 | .... | ..... |
| Struthers, Ohio | 39.50 | .... | .... | .... | ..... | | | | | | | | |
| Swedeland | 45.00 | 45.50 | 46.00 | 46.50 | ..... | | | | | | | | |
| Toledo | 38.50 | 39.00 | 39.50 | 40.00 | ..... | | | | | | | | |
| Troy, N. Y. | .... | .... | .... | .... | 46.00 | | | | | | | | |
| Youngstown | 39.00 | 39.50 | 39.50 | 40.00 | ..... | | | | | | | | |

* Republic Steel Corp. price. Basis: pig iron at Cleveland and Buffalo set by average price of No. 1 hvy. mlt. steel scrap at Cleveland or Buffalo respectively as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.

Basing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$49.50; f.o.b. Buffalo—$50.75. Add $1.25 per ton for each additional 0.50 pct Si, up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $55.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $62.46. High phosphorus charcoal pig iron is not being produced.

### *Ferromanganese*

78-82% Mn, Maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockwood, Tenn.

| | |
|---|---|
| Carload lots (bulk) | $145 |
| Less ton lots (packed) | 189.00 |
| Delivered Pittsburgh | 151.00 |

$1.80 for each 1% above 82% Mn; penalty, $1.80 for each 1% below 78%.

Briquets—Cents per pound of briquet, freight allowed, 66% contained Mn.

| | Eastern | Central | Western |
|---|---|---|---|
| Carload, bulk | 8.70 | 8.95 | 9.50 |
| Ton lots | 10.30 | 10.90 | 12.80 |
| Less ton lots | 11.20 | 11.80 | 13.70 |

### *Spiegeleisen*

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

| | 16-19% Mn 3% max. Si | 19-21% Mn 3% max. Si |
|---|---|---|
| Carloads | $51.00 | $52.00 |
| F.o.b. Pittsburg.h. | 50.00 | 51.00 |

### *Manganese Metal*

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

| | |
|---|---|
| Carload, bulk | 32 |
| L.c.l. lots | 34 |

### *Electrolytic Manganese*

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

| | |
|---|---|
| Carloads | 32 |
| Ton lots | 34 |
| Less ton lots | 36 |

### *Low-Carbon Ferromanganese*

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

| | Carloads | Ton | Less |
|---|---|---|---|
| 0.07% max. C. 0.06% P, 90% Mn. | 23.00 | 24.85 | 26.05 |
| 0.10% max. C. | 22.50 | 24.35 | 25.55 |
| 0.15% max. C. | 22.00 | 23.85 | 25.05 |
| 0.30% max. C. | 21.50 | 23.35 | 24.55 |
| 0.50% max. C. | 21.00 | 22.85 | 24.05 |
| 0.75% max. C., 7.00% max. Si. | 18.00 | 19.85 | 21.05 |

### *Silicomanganese*

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.

| | |
|---|---|
| Carload bulk | 7.80 |
| Ton lots | 9.45 |
| Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet | 8.75 |
| Ton lots | 10.35 |
| Less ton lots | 11.25 |

### *Silvery Iron (electric furnace)*

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, openhearth $78.00, foundry, $79.00; $78.75 f.o.b. Niagara Falls; $77.50 f.o.b. Jackson, Ohio. Electric furnace silvery iron is not being produced at Jackson. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for each 0.50 pct Mn over 1 pct.

### *Silicon Metal*

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

| | Eastern | Central | Western |
|---|---|---|---|
| 96% Si, 2% Fe.. | 16.90 | 17.50 | 18.10 |
| 97% Si, 1% Fe.. | 17.30 | 17.90 | 18.50 |

### *Silicon Briquets*

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si, 1 lb Si briquets.

| | Eastern | Central | Western |
|---|---|---|---|
| Carload, bulk | 5.25 | 5.50 | 5.70 |
| Ton lots | 6.85 | 7.45 | 7.75 |
| Less ton lots | 7.75 | 8.35 | 8.65 |

### *Electric Ferrosilicon*

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

| | Eastern | Central | Western |
|---|---|---|---|
| 25% Si | 15.50 | .... | .... |
| 50% Si | 9.30 | 9.80 | 10.00 |
| 75% Si | 11.80 | 12.10 | 12.85 |
| 85% Si | 13.30 | 13.60 | 14.35 |
| 90% Si | 15.00 | 15.30 | 16.00 |

### *Ferrochrome* (65-72% Cr, 2% max. Si)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

| | Eastern | Central | Western |
|---|---|---|---|
| 0.06% C | 26.50 | 26.90 | 27.00 |
| 0.10% C | 26.00 | 26.40 | 26.50 |
| 0.15% C | 25.50 | 25.90 | 26.00 |
| 0.20% C | 25.25 | 25.65 | 25.75 |
| 0.50% C | 25.00 | 25.40 | 25.50 |
| 1.00% C | 24.50 | 24.90 | 24.75 |
| 2.00% C | 24.25 | 24.65 | 24.75 |
| 65-69% Cr, 4.9% C | 18.60 | 19.00 | 19.15 |
| 62-66% Cr. 4-6% C. 6-9% Si. | 18.60 | 19.00 | 19.15 |

Briquets — Contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

| | Eastern | Central | Western |
|---|---|---|---|
| Carload, bulk | 12.50 | 12.75 | 12.85 |
| Ton lots | 14.00 | 14.90 | 15.50 |
| Less ton lots | 14.90 | 15.80 | 16.40 |

### *High-Nitrogen Ferrochrome*

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

### *S. M. Ferrochrome*

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

| | Eastern | Central | Western |
|---|---|---|---|
| Carload | 19.70 | 20.10 | 20.25 |
| Ton lots | 21.85 | 23.15 | 23.95 |
| Less ton lots | 23.35 | 24.65 | 25.45 |

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% mn, 1.25% max. C.

| | Eastern | Central | Western |
|---|---|---|---|
| Carload | 25.00 | 25.40 | 25.50 |
| Ton lots | 27.30 | 27.95 | 29.15 |
| Less ton lots | 29.10 | 29.75 | 30.95 |

### *Chromium Metal*

Contract prices, cents per lb, chromium contained carload packed, f.o.b. shipping point freight allowed, 97% min. Cr. 1% max. Fe.

| | Eastern | Central | Western |
|---|---|---|---|
| 0.20% max. C. | 97.00 | 98.50 | 99.75 |
| 0.50% max. C. | 93.00 | 94.50 | 95.75 |
| 9.00% min. C. | 91.50 | 93.00 | 94.25 |

### *Calcium—Silicon*

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

| | Eastern | Central | Western |
|---|---|---|---|
| Carloads | 16.25 | 16.75 | 18.80 |
| Ton lots | 19.35 | 20.10 | 22.25 |
| Less ton lots | 20.85 | 21.60 | 23.75 |

### *Calcium—Manganese—Silicon*

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

| | Eastern | Central | Western |
|---|---|---|---|
| Carloads | 17.50 | 18.00 | 20.05 |
| Ton lots | 19.80 | 20.65 | 22.40 |
| Less ton lots | 20.80 | 21.65 | 23.40 |

### *Calcium Metal*

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

| | Cast Turnings | Distilled |
|---|---|---|
| Ton lots | $1.85 | $2.70 | $3.40 |
| Less ton lots | 2.20 | 3.05 | 4.20 |

### *CMSZ*

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-500% C.

| | Eastern | Central | Western |
|---|---|---|---|
| Ton lots | 18.00 | 19.10 | 21.05 |
| Less ton lots | 19.25 | 20.35 | 22.30 |

### *SMZ*

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn. 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

| | Eastern | Central | Western |
|---|---|---|---|
| Ton lots | 15.75 | 16.85 | 18.80 |
| Less ton lots | 17.00 | 18.10 | 20.05 |

### *Other Ferroalloys*

| | |
|---|---|
| Ferrotungsten, standard, lump or ¼ x down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained W, 5 ton lots, freight allowed | $2.35 |
| Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V. | |
| Openhearth | $2.90 |
| Crucible | 3.00 |
| High speed steel (Primos) | 3.10 |
| Vanadium pentoxide, 88-92% $V_2O_5$ contract basis, per pound contained $V_2$ | $1.30 |
| Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb | |
| Ton lots | $2.50 |
| Less ton lots | $2.55 |
| Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo. | 95¢ |
| Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo. | 80¢ |
| Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo. | 80¢ |
| Molybdenum oxide in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo. | 80¢ |
| Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti | $1.23 |
| Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti | $1.35 |
| Less ton lots | $1.40 |
| High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton | $142.50 |
| Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton | $65.00 |
| Less ton lots | $1.25 |
| Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy. | |
| Carload lots | 18.40¢ |
| Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy | |
| Carload, bulk | 6.00¢ |
| Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y. | |
| Carload | 6.90¢ |
| Ton lots | 7.40¢ |
| Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound | |
| Car lots | 9.50¢ |
| Ton lots | 10.25¢ |

### *Boron Agents*

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

| Eastern | Central | Western |
|---|---|---|
| $1.20 | $1.23 | $1.31 |

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

| | | | |
|---|---|---|---|
| Ton lots | $1.89 | $1.903 | $1.935 |
| Less ton lots | 2.01 | 2.023 | 2.044 |

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

| | | | |
|---|---|---|---|
| Less ton lots | $1.80 | $1.8125 | $1.8445 |

Silcaz, contract basis, f.o.b. plant freight allowed, per pound.

| | |
|---|---|
| Carload lots | 39.00¢ |

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.

| | |
|---|---|
| No. 1 | 93¢ |
| No. 6 | 63¢ |
| No. 79 | 45¢ |

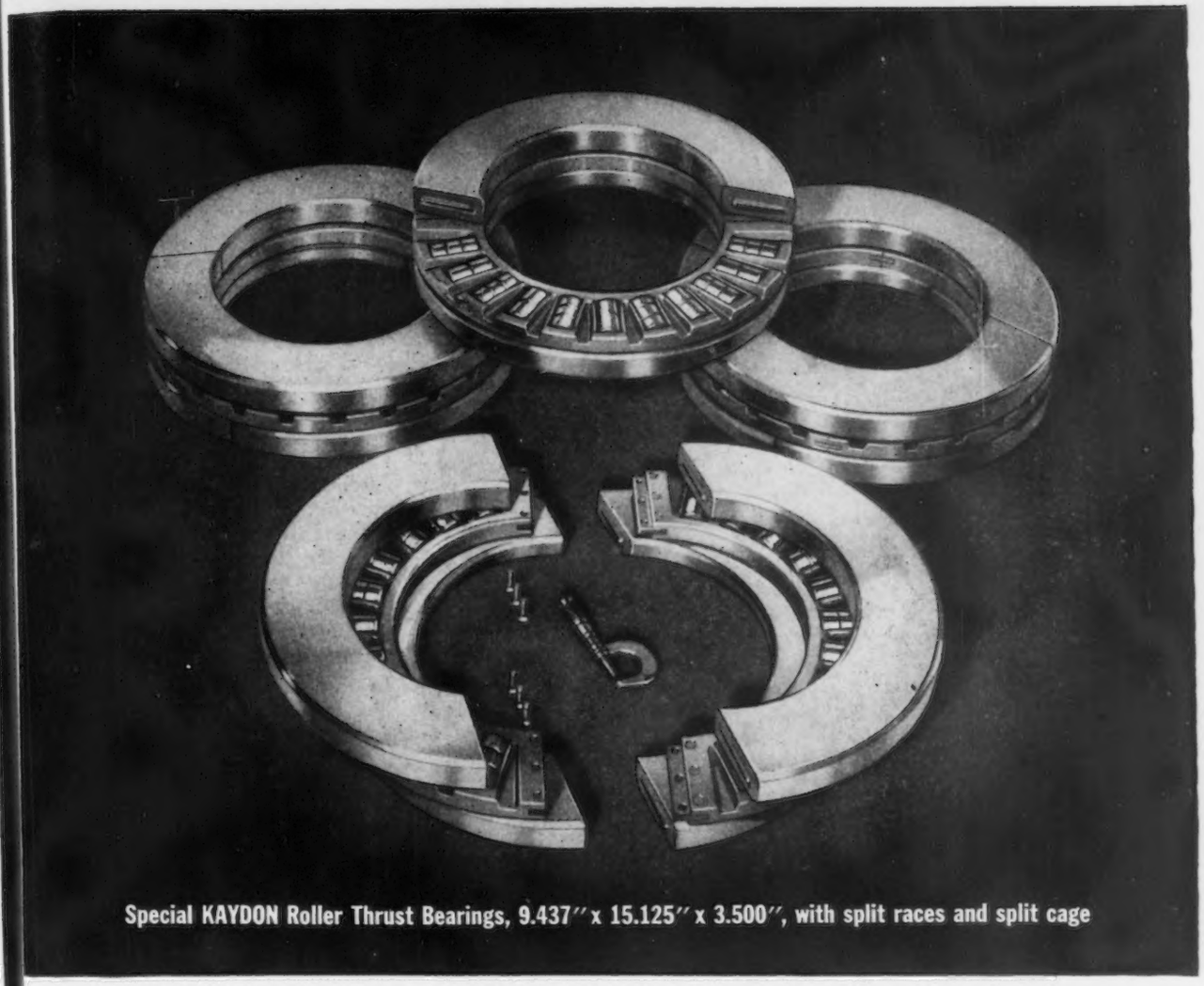
Bortram, f.o.b. Niagara Falls

| | |
|---|---|
| Ton lots, per pound | 45¢ |
| Less ton lots, per pound | 50¢ |

Carbortam, f.o.b., Suspension Bridge, N. Y., freight allowed, Ti 15-17%, B 0.90-1.15%, Si 2.5-3.0%, Al 1.0-2.0%.

| | |
|---|---|
| Ton lots, per pound | 8.0¢ |

Borosil, f.o.b. Philo, Ohio, freight allowed, B 3%-4%, Si 40%-45%, per lb contained B | $6.25



Special KAYDON Roller Thrust Bearings, 9.437" x 15.125" x 3.500", with split races and split cage

# KAYDON *Split* BEARINGS

## Easy to put on or take off without dismantling machine

EASY on . . . easy off! These special KAYDON Roller Thrust Bearings have split races and a split cage . . . so you don't have to dismantle the machine to assemble them into position or to remove them from the shaft. There are many applications where this unique type of bearing is a big saver of time and money.

The precision engineering and ingenuity which make these special bearings perform so successfully are major factors in KAYDON procedure to assure dependable quality, rugged strength, and high precision in all KAYDON standard and special bearings . . . from 4" bore to the extremely large KAYDON Bearings, up to 10 feet outside diameter. • In many fields of heavy-duty machinery, KAYDON Bearings help designers add important advantages. Steel mill equipment that operates under terrific loads and high temperatures, mammoth paper mill machinery, huge precision grinders, rugged road-building units, excavators, hoists, crushers, bending machines and other heavy-duty machines, are serving industry better because of KAYDON Bearings.

* * *

Expand your opportunities through use of these modern bearings. Capacity now available for all types and sizes. Contact KAYDON, in confidence!

KAYDON *Types of Standard or Special Bearings:*
Spherical Roller • Taper Roller • Ball Radial
Ball Thrust • Roller Radial • Roller Thrust

THE KAYDON ENGINEERING CORP., MUSKEGON, MICH.

*All types of Ball and Roller Bearings 4" bore to 120" outside diameter*

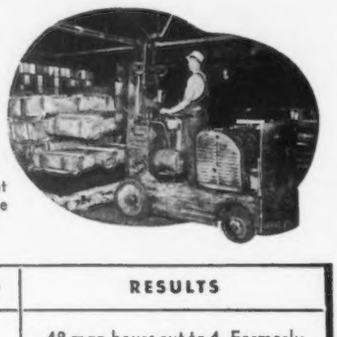
# This BAKER TRUCK
## Box Score Indicates a Winner!

**CUSTOMER:** Appliance Division, The Cavalier Corp., Chattanooga, Tennessee.

**PRODUCTS:** Coca-Cola cooler-dispenser, Quaker Oil space heater.

**TRUCKS:** 6 Baker Fork Trucks—4 2000-lb. and 2 6000-lb. capacity.

Baker 6000-lb. Fork Truck unloading skidded 6-ton packages of sheet steel from gondola cars with chain sling.



Same truck tiering sheet steel packages in storage department.

| OPERATION | TRUCKS USED | RESULTS |
|---|---|---|
| Unloading steel sheets in 3-ton skidded packages from gondola cars (50 tons per car). Transporting to storage and tiering. | Baker 6000-lb. Fork Trucks | 48 man hours cut to 4. Formerly took 6 men 8 hours for unloading alone. Now 2 men safely unload *and store* a carload in 2 hours. |
| Handling steel sheets from stores into production line. | Baker 6000-lb. Fork Trucks | More man hours saved. Aisles kept clear. |
| Handling and storing dies for stamping and blanking departments. | Baker 6000-lb. Fork Trucks | Time and storage space saved. |
| Moving finished products in cases to storage. | Baker 2000-lb. Fork Trucks | Operation speeded 50%. Warehouse capacity increased 50%. |
| Moving finished products from storage into boxcars. | Baker 2000-lb. Fork Trucks | 16 man hours cut to 1. Formerly took 4 men 4 hours to load a car. Now 1 man does it in about 1 hour. |

Baker 2000-lb. Fork Truck tiering cases of finished product in warehouse.

Baker 2000-lb. Fork Truck loading cases into boxcars.

The Baker Material Handling Engineer is at your service to help you improve your material handling box score.

**BAKER INDUSTRIAL TRUCK DIVISION** *of The Baker-Raulang Company*

2175 West 25th Street • Cleveland, Ohio

*In Canada: Railway and Power Engineering Corporation, Ltd.*

**Baker INDUSTRIAL TRUCKS**


## NEWS OF INDUSTRY

### February Production of Canadian Pig Iron Is Placed at 151,123 Tons

*Toronto*

• • • **While Canadian** pig iron production for February at 151,123 net tons fell below the 160,042 tons of January and compares with 150,632 tons for February, 1946, the decline was entirely due to the shorter month. Throughout February output was at an average daily rate of 69.3 pct of total capacity, whereas for January it was 68.6 pct, and with a day less in February, 1946 the average was 71.5 pct.

For the month under review pig iron output included 123,324 tons of basic iron of which 118,435 tons were for further use of producers and 4,889 tons for sale; 15,117 tons of foundry iron including 2,080 tons for further use and 13,037 tons for sale and 12,682 tons of malleable iron all for sale. Charges to blast furnaces in the month were 289,351 tons of iron ore; 12,765 tons of mill cinder, scale, sinter, etc., and 4494 tons of scrap. At the end of the month 11 of the 14 furnaces in Canada were in blast and three blown out.

**In the first** 2 months this year pig iron production totalled 311,165 net tons, compared with 327,945 tons in the like period of 1947 and with 286,856 tons in 1946.

Production of ferro-alloys in February fell to 11,823 tons from 17,125 tons in January and compares with 9357 tons for February, 1947. Output for February last included by tonnage, ferrosilicon, silicomanganese, ferromanganese, ferrochrome, chrom-x and ferrophosphorus.

For the first two months this year cumulative output of ferro-alloys totalled 28,948 tons against 19,001 tons in the same period of 1947 and 21,750 tons in 1946.

### Sales Rise For Quarter

*Cleveland*

• • • **Eaton Mfg. Co.** and subsidiaries report first quarter 1948 sales of $30,488,808, highest for any peacetime quarter in the history of the company and 28 pct above the first quarter of 1947. Net profit for the quarter was $2,746,861, or $3.08 per share on the 891,821 shares outstanding. Provision for taxes on income amounted to $1,929,574.

Net profit for the quarter ended Mar. 31, 1947 was $1,793,095 or $2.01 per share.

## SMALL TUBING APPLICATIONS

CHARLES T. FLACHBARTH
*Chief Engineer*

**PRECISION TUBE COMPANY**

The past thirty years have seen great strides in the number of products to which small, precision-made tubing could be applied. The effect has often been a development of new products utilizing the new methods made available by accurate tubing. In other cases, the substitution of tubing for existent parts has resulted in a better final product.

One of the earliest recommendations on record at the Precision Tube Company is for electrical instrument pointers. Here, the requirements are extremely light weight, low mass, high strength-to-weight ratio, minimum bearing load, sufficient stiffness to withstand striking the stop pin, freedom from corrosion, freedom from warping, and low cost. This is practically a description of 3S or 52S Aluminum Alloy, and their use for instrument pointers has proved to be most reliable.

Another interesting application is for phonograph tone arms. Here, the use of 52S or 61ST Aluminum Alloy Seamless Tubing has proved to be ideal, for each fulfills the requirements of light weight, structural strength, ease in fabricating, and low cost. Components of mechanical pencils and pens are also parts for which Precision has been called upon to make suggestions. The requirements are light weight, strength, low cost, fine finish, and low scrap losses in secondary operations. In this case, Seamless Red Brass and 52S Aluminum Alloy have proved to be wise choices. Spacers and similar parts for aircraft mechanisms were once a source of trouble. They must be strong, light, dimensionally stable, and corrosion resistant. Selection of 24ST and 61ST Aluminum Alloys for this application has solved the problem.

Typical applications for brasses have been pencil barrels, radio antennas, bourdon tubing, and air restriction tubing for instruments.

Wherever possible, it has been the policy of the Precision Tube Company to recommend *two* materials. Generally the customer wishes to perform additional work such as forming, color anodizing, or welding, and it is impossible to predict how each temper of every alloy will respond to the combination of steps planned. By starting with two materials, both selected to fit the end use, it is usually possible to evaluate the factors which make a particular alloy suitable or unsuitable and, thus, finally arrive at not merely a material that will suit the job, but the very best one . . . in the best metallurgical condition. By considering this as one of its greatest responsibilities, the Precision Tube Company has been able to provide hundreds of customers with the best type of tubing for their needs.

*(Advertisement)*


# N^TH DEGREE ACCURACY

## . . . ONE INCH TO ONE MILE!

**Precision Made Seamless Non-Ferrous Tubing meets and beats most exacting requirements . . . performance tests.**

**Precision Research** subjects non-ferrous metals to rigid tests which assure reliable service under extreme conditions. Detailed application analysis of aluminum alloys, copper, brass, nickel, monel, cupro-nickel, and nickel silver, has resulted in the proper use of tubing for instruments, gauges, pointers, mechanical pencils, pens, connector pins, metal shielded wire and many other products.

**Precision Production** makes possible the manufacture of tubing of high uniformity, accurate tube size and wall thickness, correct temper, and a bright clean finish. In such operations as drawing and hydrogen annealing, modern Precision equipment and thirty years' experience give you tubing held to extremely close tolerances on all specifications.

**Precision Inspection** carefully checks every inch of tubing produced. Precision Tubing, in any shape, with outside diameters of 0.500" to 0.010" and wall thicknesses down to 0.0015", is available on good delivery in either cut or random lengths.

## WHEN PRECISION COUNTS . . . COUNT ON PRECISION

Aluminum alloy instrument tubing to exact specifications . . . preformed tubing to suit your needs . . . Coaxitube—the metal shielded wire for a 1001 electronic uses. Write for complete catalog today.

# PRECISION TUBE CO.

PRECISION

Factory: 3824-26-28 TERRACE STREET, PHILADELPHIA, PA.

High Grade
ROLLER DIES

To Form Tubes . . . .
Pipe and Cold Rolled Shapes

Our efficient manufacturing methods assure quality, performance and lower tooling cost.
We are equipped to design and manufacture rolls of any profile or to produce any desired shape.
All inquiries will receive our immediate attention.

ARDCOR

AMERICAN ROLLER DIE CORPORATION
FORMERLY NATIONAL ROLL & MACHINE COMPANY
20500 ST. CLAIR AVE. • CLEVELAND 17, OHIO

Do you use Perforated Metal?

If perforated metal is required for any of your products, let Hendrick quote on fabricating it to your specifications. An unsurpassed stock of tools and dies, and ample plant facilities, enable Hendrick to give unexcelled service in furnishing perforated metal with any shape or size of openings, from any commercially rolled metal, in any desired gauge. Write for full information.

SEE OUR CATALOG IN SWEET'S

HENDRICK
Manufacturing Company
37 DUNDAFF STREET, CARBONDALE, PENNA.
Sales Offices In Principal Cities

Perforated Metals
Perforated Metal Screens
Architectural Grilles
Mitco Open Steel Flooring,
"Shur-Site" Treads and
Armorgrids


## NEWS OF INDUSTRY

### Sees 50 Pct. Increase In Farm Implement Output

*Washington*

• • • **Production of** farm machinery, parts and equipment last year increased 50 pct over the dollar value of such items in 1946, according to preliminary figures of the Census Bureau. Total shipments during 1947 were valued at $1.25 billion, including $524 million worth of farm-type tractors and parts.

Shipments to domestic markets last year represented 88 pct of total value, it was said, as compared with 90 pct for 1946. Total farm machinery shipments for 1946 were placed at $834 million worth.

At the same time, census reported that complete tractor shipments last year, including farm-type, were valued at $719 million plus $210 million worth of attachments and parts.

Unit shipments of wheel-type tractors totaled 420,000, an increase of 64 pct over 1946; track-laying types totaled 38,000 units, an increase of 43 pct; and, 166,000 garden type tractors were shipped during the year.

### McKee Shows Net Profit of $695,254 for 1947

*Cleveland*

• • • **Arthur G. McKee & Co.** has reported net profit for 1947 of $695,254, compared with $403,828 for 1946. Net is equal to $2.80 per share on the 248,241 shares of Class B stock outstanding (exclusive of shares in the Treasury) compared with $1.63 per share on the basis of the same number of shares in 1946.

The company's dollar volume of new contract work, measured by the estimated cost of plant to be designed and built, approximated $58 million in 1947, compared with about $50 million in 1946.

Design and construction work in the petroleum refining industry accounted for about 60 pct of the 1947 total volume and the iron and steel industry about 40 pct, according to the annual report.

Uncompleted work in process approximated $70 million at the end of 1947, covering installations in 12 states and five foreign countries and included five complete refineries, nine blast furnaces and numerous other iron and steel projects.

In addition to having a substantial backlog of contract work at the

end of 1947, the company also had favorable prospects for new work.

In terms of estimated plant cost, this market probably totals several billion dollars. In the iron and steel industry in this country, continued utilization of full capacity of the industry is resulting in extensive plant rehabilitation. Also, because reserves in this country of high-grade iron ore are being rapidly depleted, new facilities and plants will soon be needed to permit the use of taconites and other low-grade iron ore.

With respect to foreign countries, additional iron and steel capacity is being contemplated in Canada; a major iron and steel plant expansion program is being planned in India; and England has already embarked on a large expansion and modernization program. In the petroleum refining industry in this country, estimates have been made that the industry will need 600,000 additional barrels daily of refining capacity within the next 5 years, and that foreign refining daily capacity may expand by nearly 1 million barrels in the same period.

During 1947, shortages and slow deliveries of materials and an inadequate supply of skilled construction labor continued to delay progress on, and completion of, the company's contract work.

To meet continued increasing demands for its services, additional space and personnel are needed in Cleveland and the company is providing the space by extending the eastern wing of its main office in Cleveland, which will add approximately 9000 sq ft of floor space.

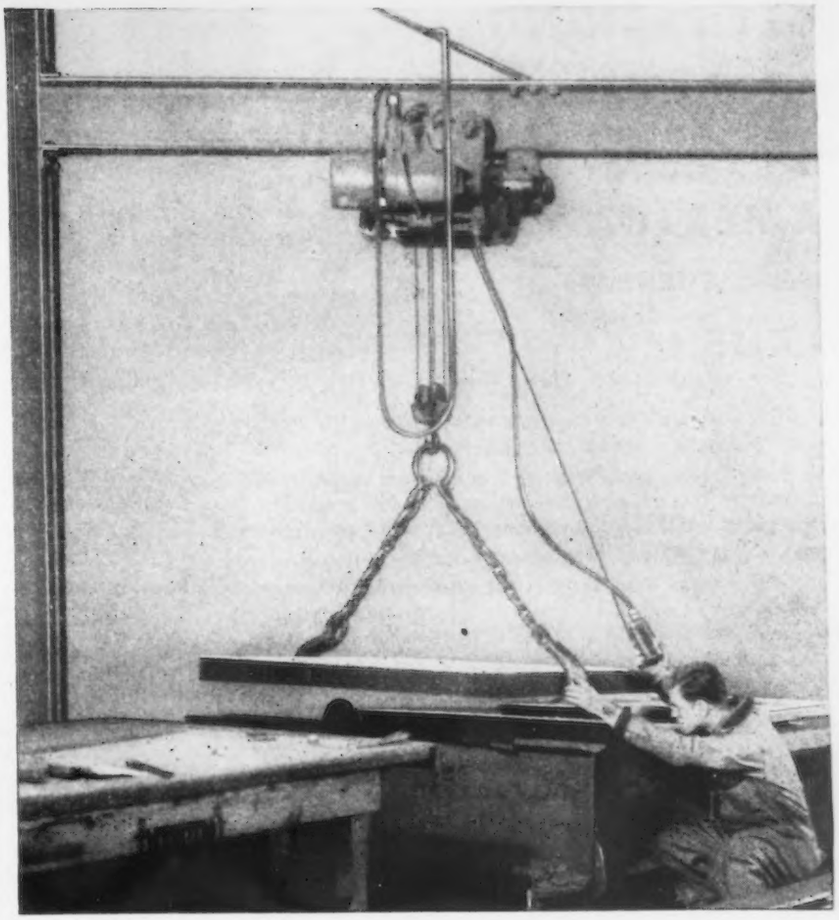
## J & L Offers Tinmill Film

*Pittsburgh*

• • • **A 5-min sound motion** picture film entitled "The World's Fastest Steel Rolling Mill", which describes the new 5-stand tandem mill at the Aliquippa Works, is available for distribution on request, it is announced by Jones & Laughlin Steel Corp. here.

The newsreel type film shows the layout of the mill, the welding machine on the continuous pickle line, the entry end of the tandem mill, close-ups of the delivery end of the tandem mill, and follows the production of steel strip for tinplate through the J & L assorting room at the tin mill.

J & L's advertising department, 311 Ross St., Pittsburgh 30, is handling all requests for the film.

**Cut Costs Where Costs Start**

**Slab cutting needs faster, more accurate material handling to save time cost. A NORTHERN ELECTRIC HI-LIFT HOIST will help an operator to load, cut, unload slabs quickly and accurately—save time and avoid delays.**

★ **Let us send you Bulletin 121-H** ★

OVERHEAD ★ ELECTRIC CRANES ★ AND HOISTS ★

**NORTHERN ENGINEERING WORKS**

2615 Atwater St., Detroit 7, Mich.

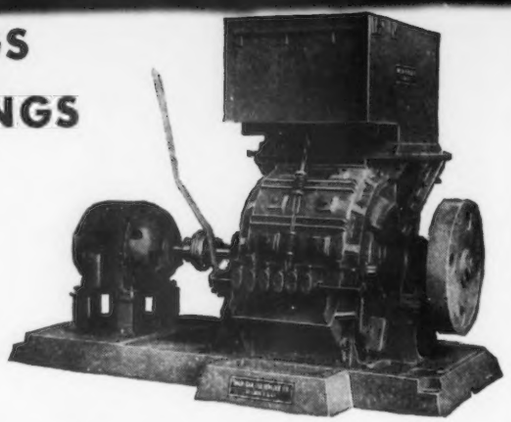
# GET EARNINGS FROM TURNINGS

with the

# AMERICAN

*METAL TURNINGS*

# CRUSHER



Handling 20 or more tons per month will justify installation, and get these profitable returns:

1. Reduced to chips, required storage space is reduced by 30% to 80%.
2. Reclaims 30 to 50 gallons more cutting oil per ton — and faster.
3. Easier to handle — shovel — conveyor — full weight, packed loads.

And if your plant is briquetting for better furnace charging with higher analysis, there is an American Crusher to reduce costs and scrap loss. American capacities range from 1 to 10 tons per hour for shredding turnings of alloy steel, aluminum, brass or bronze.

Patented manganese shredder rings, revolving free on individual shafts, prevent clogging and damage to crusher from tramp iron.

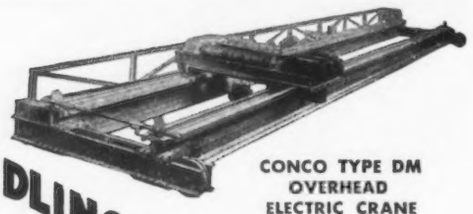
*Send for Metal Turnings Bulletin*

*American* PULVERIZER COMPANY

*Originators and Manufacturers of Ring Crushers and Pulverizers*

1539 MACKLIND AVE.
ST. LOUIS 10, MO.

# CONCO HANDLING EQUIPMENT



CONCO TYPE DM
OVERHEAD
ELECTRIC CRANE

● WRITE today for complete information on the CONCO line of hand-powered and electric cranes, hoists and trolleys — a complete line, tried and proven for over twenty years. CONCO engineers are qualified to recommend the right type of handling equipment for faster, more economical production in your shop. Write us now, and take advantage of our long experience in moving more materials, faster and at less cost.

CRANES • HOISTS • TROLLEYS

Division of
H. D. Conkey & Co.

CONCO ENGINEERING WORKS, 15 Grove St., MENDOTA, ILL.


## NEWS OF INDUSTRY

### *ERP Difference Between Profit and Loss, A. G. Bryant Tells Builders*

*Chicago*

• • • **The American** metalworking industry, which uses some 1,750,000 machine tools, is operating at not more than 65 pct efficiency today because it continues to use obsolete machine tools. This was the keynote of the address by A. G. Bryant, president of the National Machine Tool Builders' Assn., at the organization's 46th spring meeting held in Chicago on Apr. 8 and 9.

American metalworking plants are suffering unnecessarily from obsolescence caused by the fact that 90 pct of the machine tools used are of prewar design and many machines in use are 20 to 30 years old. The metalworking industry in America could, with the same manpower, increase output by as much as 50 pct if it were equipped with the 1948 models of machine tools, Mr. Bryant indicated.

The European market, under ERP which is now law, may mean the difference in 1948 between profit and loss for the machine tool industry, it was pointed out by M. A. Hollengreen, president of Landis Tool Co., Waynesboro, Pa. With the industry operating today at only slightly better than 50 pct of capacity, there is no particular problem on delivery of this equipment. The hurdle seems to be, however, the vagaries of government regulations and licensing procedure.

The ERP excluded machine tools in the original recommendations, but it appears that the ERP Administrator has broad discretionary powers and may utilize the open capacity of the industry. The purpose behind the association's drive to bring machine tools to the attention of ERP administration, in addition to selling machine tools, is to establish productive capacity in Europe so as to minimize the drain on American resources. The sooner Europe becomes self-sustaining, the quicker the United States can shut off direct aid. Machine tools are productive products rather than end products, and will aid in developing the industry of Europe.

Mr. Hollengreen indicated that several foreign purchasing commissions have been in the United States to get second hand machine tools through the War Assets Administration, but to date have been

unsuccessful. For example, one commission spent 2 months in this country, lined up about 200 machine tools through WAA, and then found that 90 pct of these were JANMAT tagged. Of some 102,000 tools tagged for JANMAT, only 247 have been released. The disposal of this equipment through WAA is about completed, there being only about 10 pct of the original inventory left to be sold.

In addition to problems in licensing, there is also a major hurdle to foreign sales in credit insurance and financing of foreign credits. As to licenses, the primary difficulty here is in the fact that there is no certainty as to whether a license will be revoked between the time it is issued and the equipment is shipped. There are no channels established for financing foreign credits, and up to the present time it is more or less up to the builder to handle his own credit arrangements.

The domestic outlook is not encouraging. The industry is having difficulty in selling consumers on the economics of newer type machine tools. There appears a definite tendency on the part of machine tool users to make do what is now in operation, despite the fact that many new developments in the industry assure tangible savings in operating costs and reductions in labor costs.

## *British Labor Force Shows Improvement During Past Year*

**A considerable** improvement in the labor force in the foundry industry, and a large increase in production, are shown in a survey issued by the British Ministry of Supply.

Labor figures for total process and maintenance workers are:—4 Jan. 1947, 127,062; 5 Apr. 1947, 130,648; 5 July 1947, 131,366; 4 Oct. 1947, 134,292; 10 Jan. 1948, 138,168. The total increase over the year equals 11,106, but there are still large outstanding demands for both skilled and unskilled operatives.

As an indication of output per man, two peak production periods have been taken into account, i.e. last quarter 1946, when output equalled 709,498 tons with a labor force of 127,062, and last quarter


Electro-Magnetic Separators VERSUS

PERMANENT MAGNET SEPARATORS

**DON'T BE MISLED!!!**

Permanent Magnets have been improved—yes, but they will never be a substitute for a well designed electrically energized magnetic separator for removing dangerous tramp iron from ALL MATERIALS under ALL CONDITIONS.

We make separators with permanent magnets but only for limited applications.

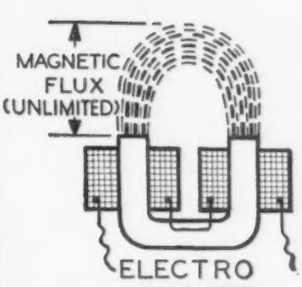
We cannot jeopardize our reputation as the foremost manufacturers of magnetic separation equipment by recommending permanent magnets for general applications.

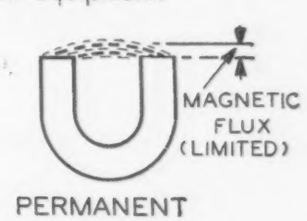
Permanent Magnets are not a PANACEA for ALL MAGNETIC separation problems.

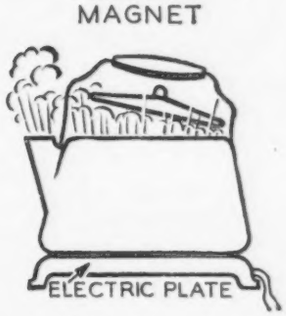
Why be a "guinea pig" for innovations in magnetic engineering?

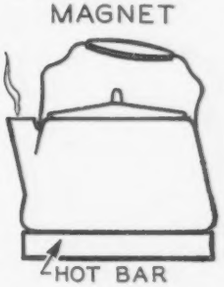
Consult Stearns Magnetic Engineers for tried and tested magnetic separation equipment.

Consult Stearns Magnetic Engineers for tried and tested magnetic separation equipment.




See what we mean? Continuous heat means more power! Likewise, continuous or electrically energized magnets mean greater magnetic flux or power, more efficient separation for you, all of the time. Important for you!

**STEARNS MAGNETIC MFG. CO.**

635 So. 28th St., Milwaukee 4, Wis.—SEPARATORS - CLUTCHES - BRAKES - MAGNETS

With an unfailing supply of premium steel, JOHNSON nationwide, streamlined service on high-quality specialty steel wires is in high gear . . . . and with it JOHNSON unexcelled quality. Laboratory supervision from mine to finished product.

There is a Johnson office near you, and warehouse stocks in Worcester, Chicago and Los Angeles.

JOHNSON

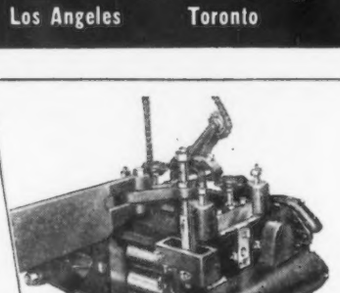
STEEL AND WIRE COMPANY, INC.

WORCESTER 1, MASS.

New York Philadelphia Cleveland Detroit Akron Chicago
Atlanta Houston Tulsa Los Angeles Toronto



Assures
Fast—Safe—Accurate
Feeding of
Coiled Strip Stock



WITTEK *Automatic*
ROLL FEEDS AND REEL STANDS

*For All Types of Punch Presses*

Wittek *Automatic* Roll Feeds provide maximum efficiency in the high speed automatic feeding of all types of coiled strip stock to punch presses. Highly flexible in function and application, they are capable of feeding lengths up to 24" per stroke of the press and will handle various stock thicknesses in widths up to the maximum width of the rollers.

Wittek *Adjustable* Reel Stands provide automatically expanding coil holders that center the coil and assure maximum production by eliminating looping, tangling and back lash of stock. If your production problem involves feeding coiled stock to punch presses, consult us. Your inquiry will be given immediate attention. Ask for completely descriptive catalog.

WITTEK Manufacturing Co.
4305-15 W. 24th Place, Chicago 23, Illinois

*Automatic* ROLL FEEDS *and* REEL STANDS




1947, when output equalled 809,846 tons with a labor force of 138,168. These figures represent respectively 5.58 tons and 5.86 tons per operative.

**An important point** to be taken into account is that up to the end of 1946 the industry was working a 47 hour week, whereas from January 1, 1947, a 44 hour week was in operation.

The figures show, therefore, a higher output per man-hour on the reduced working hours.

Production over the four quarters of 1947 was as follows:—First quarter, 630,219 tons, second quarter, 714,787 tons, third quarter, 691,533 tons, fourth quarter, 809,846 tons.

The above figures show a total production for the year of 2,846,385 tons, with the last quarter representing an annual output of 3,000,000 tons compared with the last quarter of 1946, which represented an annual output of 2,638,000 tons.

The principal increases show the efforts which have been made by the industry to meet priority demands. The increases have mainly been on the following products:—Cast-iron pipes and fittings, agricultural castings, colliery castings, electrical industry, chemical plant and atomic energy, gas producing plant, railway castings, iron and steel works plant.

## *Canadian Steel Output Continuing Firm Pace*

*Toronto*

• • • **Canadian steel mills** are maintaining production at virtual capacity and for the first two months this year there has been comparatively little change in the daily rate. For February production of steel ingots and castings amounted to 239,646 net tons or average of 85 pct of total rated capacity, and compares with 256,726 tons for January when the average was 85.2 pct, and with 229,222 tons for February, 1947. In the month under review production included 230,183 tons of steel ingots and 9,463 tons of steel castings.

During February charges to steel furnaces included 121,865 tons of pig iron, 76,704 tons of scrap of consumers own make and 65,764 tons of purchased scrap.

In the first two months this year production of steel ingots and castings totalled 496,372 net tons.

# Personals

*(Continued from p. 112)*

• **Edgar A. Steele** has been appointed regional sales director of A. J. Wood & Co.'s New York office.

• **Royal A. Stone** has been appointed chief engineer for the eastern district of the H. K. Ferguson Co. with his headquarters in New York.

• **R. S. Pollard,** formerly of Pyle-National Co., has been made sales manager of the steam trap division of Yarnall-Waring Co., Philadelphia. **Leland C. Campbell** has been appointed southwestern representative, working from the Dallas sales office; **Howard R. Wunker,** sales representative in the company's new Cincinnati office, and **J. Frank Long,** sales representative in the company's new St. Louis office.

• **Frank M. Smith** has been appointed comptroller of the Rack Engineering Co., Pittsburgh. The accounting department will be transferred to the factory at Connellsville, Pa. Prior to his affiliation with Rack Engineering, Mr. Smith was with the Navy Dept. as a civilian accountant.

• **L. W. Stolte,** secretary of Fairbanks, Morse & Co., Chicago, for the past year, and **Frederick J. Heaslip,** for a number of years director of purchases, have been elected directors of the company.

• **A. King McCord** has been promoted from vice-president in charge of operations to first vice-president of the Oliver Corp., Chicago. **O. E. Eggen,** director of engineering, has been elected vice-president. **R. E. Melvin,** general works manager, has been made vice-president in charge of manufacturing at Oliver's Charles City, Battle Creek and Cleveland plants, and **C. L. Hecker,** general manager of South Bend plants, has been promoted to vice-president in charge of manufacturing at South Bend, Shelbyville and Springfield plants.

• **Joseph A. Lowman,** formerly superintendent of the openhearth department at the Ensley works of the Tennessee Coal, Iron & R.R. Co., Birmingham, has been transferred to a similar position at the company's Fairfield steel works. Mr. Lowman succeeds **A. H. Hoyle,** retired. **Howard R. Barr,** formerly assistant superintendent of the

THE NATION STANDS a good chance of slipping on a living room rug and falling flat on its face, if a safety survey of a half-million school children is any indication.

Conducted by the Greater New York Safety Council, the survey gave the youngsters a series of safety situations to check—to see if they were followed in individual homes. Number one hazard, among those listed, was small rugs on slippery floors, not tacked down and not made skidproof.

Last year the survey—one of the largest conducted in the country — showed tha... was improper... mable materia... line, kerosene a...

Second most ... the children sai... bers of their ... doors and bure... diately after ... surprising nu... ies, the safety...

In third pla... mable liquids ... ing, and in the ... of sturdy bases ... on when reach...

Families ... in leaving m... small children...

The childre... windows unsc... could fall out... ported a bump... electric cords ... starters.

## Explosion ... Down Base...

A heater e... the basement a...

Mrs. Reec... out of her cha... on the first ... foot of the ... floor. A phy... bruises and sh...

The oil heat... blast knocke... between the b... and tore the g... hinges. The ki... ripped loose.

The dining ... knocking over ... were called, b... flames.

## Jap Croc... First Tri...

Ship manifes... Maritime Exch... the arrival he... ware for the... war.

The Norwe... brought 30 ca... well as 32 cas... necklaces.

The British ... brought 4,500 cases of sheet rubber from Batavia, Netherlands East Indies.

EXPENDITURES for maintenance and repair of existing buildings are expected to total about $6 billion in 1948, about the same figure as in 1947, according to a forecast prepared by the economists of Producers' Council, David S. Miller, Council president, stated today. The Producers' Council, Inc., is a national organization of manufacturers of building materials and equipment.

"With repair work included, the total volume of all building next year, including new construction, is expected to approximate $20 billion," Dr. Mil... said.

The co... 000 gallon... and used... said. The... has been... the use o... cubic fee... kitchen ra...

The co... the U. S. ... tankers t... oil here ... bought in... company ... being pr... Coast.

City ice... ge at... compa... of 500,... plant.

... Seeg... ts said t... ay sudde... be a sl... seasona...

...ia's mo... more... whistle... ...d ville... ...n oil... Warren... ported... 41 belo... he Stat... e, a tin... 35 belo... ton Stat... d an u... below... in Willi...

..., the M... s of ice... of coal...

...en in... ted that... t least fi... he ice a...

...ssure ... through... ...ly with... ...h at th... with fr...

...ast, te... elow fr... ...ig but...

...above, ... rowded.

...es

...re tak... morrow... ...y cere... ...ying of... ...ent in...

...ongress... ...nuel C.... ...itizens... ...st Co.,... ...'s 7th...

...at Inde... featured...

Br... ...disastrous armory fire more than 10 years ago.

Emergency squads of police were summoned to handle spectators who


# Zorball cleans up local trouble spots

There's one safe, certain answer to the dangerous grease and oil spots you find around machines and on plant floors. It's ***Wyandotte Zorball,*** the all-purpose floor absorbent.

***Zorball*** is easy and economical to use. A thin layer of this granular product absorbs oil, grease, water, paints and other liquids quickly and completely. It provides an immediate anti-slip surface underfoot.

Even when saturated, ***Zorball*** retains its original form. There's no caking, packing nor forming of "mud" to be tracked around the shop. It will not injure fabrics, wood, metals, rubber, or the skin of those who handle it.

Furthermore—and this is important—***Zorball*** helps prevent fire hazards. It is chemically inert and nonflammable ... resists combustion even when oil-soaked.

***Wyandotte Zorball*** is listed by Underwriters' Laboratories.

Ask your nearest Wyandotte Representative for complete information on ***Zorball.*** All you have to do is give him a call.

*Trouble afoot? Why not try* WYANDOTTE ZORBALL

Wyandotte
REG. U. S. PAT. OFF.

**WYANDOTTE CHEMICALS CORPORATION**

WYANDOTTE, MICHIGAN • SERVICE REPRESENTATIVES IN 88 CITIES

**Preformed**

**Non-Preformed**

When you specify "HERCULES" (Red-Strand) Wire Rope, you select a product that has proved its dependability—time after time—by the acid test of actual service. For wire rope qualified to withstand the strains and stress of tough jobs . . . use "HERCULES", and benefit by its time and money saving qualities. *We invite your inquiries.*

MADE ONLY BY

**A. LESCHEN & SONS ROPE CO.**

ESTABLISHED 1857

5909 KENNERLY AVENUE • ST. LOUIS 12, MO., U. S. A.

NEW YORK 6 • CHICAGO 7 • HOUSTON 3 • DENVER 2
LOS ANGELES 21 • SAN FRANCISCO 7 • PORTLAND 9 • SEATTLE 4

Fig. 926
Pat. & Pats. Pending
Drawer is extra.

HALLOWELL

**READY-MADE WORK BENCHES OF STEEL**

These exceptionally sturdy, *ready-made* "Hallowell" Work Benches of Steel, with smooth, serviceable laminated wood tops, withstand wear, year-in and year-out. Unlike wooden benches "Hallowell" Steel Benches are standardized as to lengths, widths and heights and may be easily moved and re-arranged to suit. They can also be bolted together to form continuous benches of almost any length; therefore, they represent the most serviceable and inexpensive shop equipment, because of their extreme flexibility. If so desired, "Hallowell" Bench tops may be of steel, or steel covered with "Tempered Presdwood." Prices and deliveries are very attractive . . . ask for your copy of the "Hallowell" Shop Equipment Catalog.

***Write for the name and address of your nearest "Hallowell" Industrial Distributor.***

***OVER 45 YEARS IN BUSINESS***

**STANDARD PRESSED STEEL CO.**

JENKINTOWN, PA., BOX 523 • BRANCHES: BOSTON • DETROIT • INDIANAPOLIS • CHICAGO • ST. LOUIS • SAN FRANCISCO


## PERSONALS

openhearth department at Ensley, has been promoted to superintendent and **Jack M. Stone,** formerly night superintendent, has been named assistant superintendent. **Clarence C. Benton** has been promoted from night superintendent to assistant superintendent at Fairfield openhearth department. **Edward M. Gale** has been appointed superintendent of the rail fastenings department of Fairfield steel works, and **Clyde A. Sutherland,** assistant to the superintendent of the same department; **Hollis B. Howell,** superintendent of fabrication and erection in the shops division, and **Albert C. Jones,** assistant superintendent. **Robert C. Collins** has been transferred from Fairfield steel works to become assistant to the superintendent at Fairfield wire works.

• **E. C. Troy** has been appointed to serve as sales engineer in eastern Pennsylvania, New Jersey, Maryland and Delaware of the Foundry Equipment Co., Cleveland. He recently resigned as vice-president of Dodge Steel Co. **Fred W. Fuller** has been appointed sales engineer for northern Ohio except the counties of Williams, Fulton and Lucas.

• **George D. Mitten** has been named manager of the Argonaut Realty Div. of Generaal Motors Corp., Detroit. He has been associated with Argonaut since 1928 and with General Motors since 1919.

• **E. H. Welker,** president of Welker Machinery Co., Freezway, Inc., and Welker Supply Co., has been appointed a director of Niles Tool Work Co. of Hamilton, Ohio.

• **D. C. McNeely** has been appointed manager of the Morse-Rockford sales division, Morse Chain Co., Detroit. He retains his position as manager of Morse distributor sales.

• **Maxim M. Cohen** has become associated with M. S. Kaplan Co., Chicago. He was formerly an executive of the North Pier Terminal Co. and East Chicago Dock Terminal Co.

• **William D. Nesbeitt** has been named manager of Allis-Chalmers Mfg. Co.'s Spokane district office. Mr. Nesbeitt joined Allis-Chalmers in 1946 and served in its crushing, cement and mining section until 1947, when he was transferred to the company's Seattle office. **A. R. Kohlmetz,** whom Mr. Nesbeitt succeeds, remains in the Spokane office as special representative.

## PERSONALS

• **James M. White,** formerly vice-president in charge of manufacturing at Allis-Chalmers Mfg. Co.'s Milwaukee plant, has joined the Allen-Bradley Co., Milwaukee, as a member of the production management staff.

• **Robert E. Busey,** acting chief engineer for Willys-Overland Motors, Toledo, has been promoted to chief engineer. He succeeds **Walter D. Appel,** who has been appointed director of procurement for the company.

• **W. C. Cade,** general shop foreman, locomotive back shop, Chicago Great Western Ry. Co., Oelwein, Iowa, has retired after more than 42 years of service. **R. Logeman,** master mechanic, in addition to his present duties, now has charge of locomotive back shop. **J. P. Becker,** assistant to superintendent motive power, has been appointed general mechanical inspector. **A. L. Porter,** supervisor internal combustion locomotives, has been made general supervisor diesel locomotives, and **W. L. Castleman,** assistant supervisor internal combustion locomotives, has been appointed assistant general supervisor diesel locomotives.

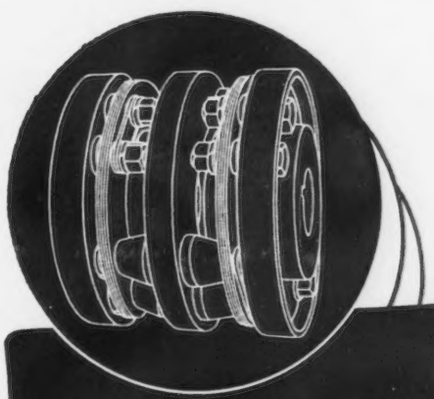
• **W. P. Andrews, Edward Lehr** and **James A. Perry** have been added to the staff of Nottingham Steel Co., Cleveland. Mr. Andrews, formerly manager of sales, Cleveland office of Carnegie-Illinois Steel Corp., has been appointed assistant general sales manager at Nottingham. Mr. Lehr, formerly Cleveland office manager, Joseph T. Ryerson & Son, Inc., has been named assistant to T. Stenson White, vice-president in charge of sales for Nottingham. Mr. Perry was formerly associated with Republic Steel Corp.

• **Arthur C. Croft,** president of the National Foremen's Institute, has been elected a director of the Western Foundry Co. of Chicago.

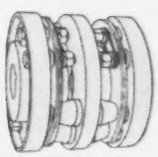
• **James R. Wilson** has been appointed vice-president of Mid-West Forging & Mfg. Co., Chicago. Mr. Wilson was previously secretary and assistant treasurer of the company and has been with the organization for 10 years. **Ray T. Johnson** has been named to succeed Mr. Wilson as secretary and assistant treasurer. **Noble Gibson** has been appointed manager of sales, and **Gregory P. Baker** has been named superintendent of the Mid-West plant at Chicago Heights, Ill.

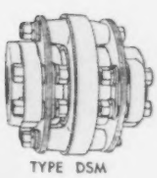

THOMAS
*Flexible* COUPLINGS

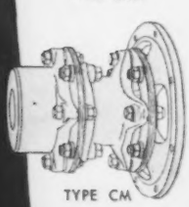
....are specified by engineers, wherever 100% Operating Efficiency is demanded

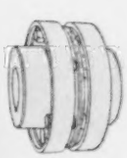


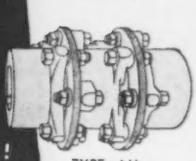
THOMAS
*Flexible* COUPLINGS
provide for
Angular and Parallel Misalignment as well as Free End Float...
*and Eliminate*
BACKLASH, FRICTION, WEAR and CROSS-PULL
NO LUBRICATION IS REQUIRED!


TYPE DBZ

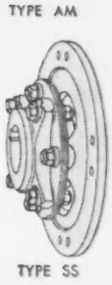

TYPE DSM

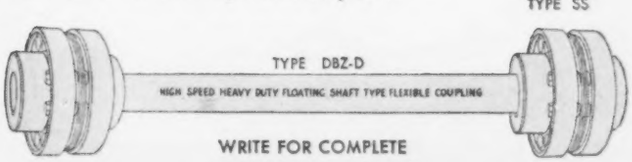

TYPE CM


TYPE ST


TYPE AM

The Thomas All-Metal Coupling does not depend on springs, gears, rubber or grids to drive. All power is transmitted by direct pull.


TYPE SS




WRITE FOR COMPLETE ENGINEERING CATALOG

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

# POWER TRANSMISSION EQUIPMENT

## Brad Foote Gears

**WORMS** — Milled up to 12" dia. — up to 1 D.P.

**WORM GEARS** — Generated up to 108" dia. — up to 1 D.P.

**HERRINGBONE GEARS** — up to 60" P.D. 18" face, 2 D.P.

**STRAIGHT BEVEL GEARS** — Straight tooth — up to 60" dia., 10" face up to 4½" C.P.

**HELICAL OR SPIRAL GEARS** — Generated up to 108" dia., 16" face — up to 1 D.P.

**SPIRAL BEVEL GEARS** — up to 32" dia., 6" face, up to 1½ D.P.

**HELICAL GEARS** — Ground tooth up to 14" dia., 6" face, 2 D.P.

**SPUR OR HELICAL GEARS** — Shaved tooth up to 20" dia., 8" face, 2 D.P.

**SPUR GEARS** — Form Cut—to 96" dia., 24" face — up to 4" C.P.

**SPUR GEARS** — Hobbed Generated — to 108" dia., 18" face — up to 1 D.P.

**SPUR GEARS** — Fellows Generated—to 140" dia., 8" face, up to 1 D.P.

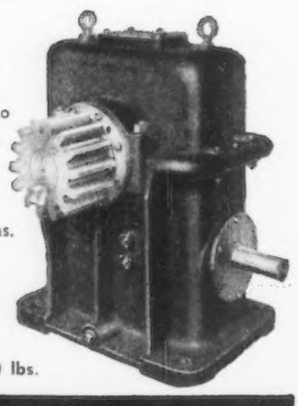
**SPUR GEARS** — Ground tooth up to 18" dia., 12" face — 2 D.P.

**INTERNAL GEARS** — Form cut up to 72" dia., 12" face — up to 1 D.P.

**INTERNAL GEARS** — Generated up to 120" dia., 8" face — up to 1 D.P.

**ACME SCREWS** — Milled up to 6" dia. 30 ft. length

## SPEED REDUCERS



**WORM GEAR** — Ratios 3⅜ to 1 to 60 to 1 Single, Double Reductions up to 10,000 to 1.

**HERRINGBONE GEAR** — Ratios 2 to 1 to 295 to 1 Single, Double and Triple Reductions.

**GYRO** — Ratios — 24 to 1 to 3600 to 1

**OIL WELL UNITS** — 28.4 to 1 Double Reduction Peak torque 24,750 lbs. to 69,500 lbs.

## BRAD FOOTE GEAR WORKS

1309 So. Cicero Ave., Cicero 50, Ill

# practically infinite selection for perfect finish at exact speeds

Model 103VS with 1 motor
Model 104VS with 2 motors

## UNITED STATES VARI-SPEED BUFFING AND POLISHING MACHINES

Exquisitely fine speed variations between 1500 and 3000 rpm give you every correct speed for POLISHING, BUFFING, COLORING and other operations which depend on exact speeds.

The hand wheel indicator located on front of machine adjusts the exact speed. Motors can be furnished either open type ball bearing or totally enclosed ball bearing, fan cooled at additional cost, price on application. Magnetic starter. Chrome-manganese spindle in heavy duty ball bearings, perfectly lubricated. Combination switch and hand brake for stopping wheels quickly and shaft lock for holding spindle while changing wheels.

Single or dual spindles, in four models.

**CONTACT YOUR DISTRIBUTOR OR WRITE DIRECT**

The UNITED STATES ELECTRICAL TOOL Co.
CINCINNATI, OHIO